NMED AIR QUALITY APPLICATION FOR TITLE V MINOR MODIFICATION

EL PASO NATURAL GAS COMPANY, LLC
WASHINGTON RANCH STORAGE FACILITY

Prepared By:

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December 2022

Project 223201.0222

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December 21, 2022

Permit Programs Manager
NMED Air Quality Bureau
525 Camino de los Marquez Suite 1
Santa Fe, NM 87505-1816

Application for Title V Minor Modification-El Paso Natural Gas Company, LLC- Washington Ranch Storage Facility

Permit Programs Manager:

El Paso Natural Gas Company, LP is submitting this this application for a Title V Minor Modification for its existing Washington Ranch Storage Facility. This submittal is pursuant to 20.2.70.404.B NMAC.

The format and content of this application are consistent with the Bureau's current policy regarding Title V applications; it is a complete application package using the most current application forms. Enclosed is one hard copy and one working copy of the application, including the original certification page, electronic files, and an application check. Please feel free to contact me at (505) 266-6611 or by email at aerenstein@trinityconsultants.com if you have any questions regarding this application. Alternatively, you may contact Richard Duarte with El Paso Natural Gas Company, LLC at (505) 831-7763 or by email at ricardo_duarte@KinderMorgan.com .

Sincerely,

Adam Erenstein
Manager of Consulting Services

Cc: Richard Duarte (El Paso Natural Gas Company, LLC)
Trinity Project File 223201.0222

Mail Application To:		**For Department use only:**
New Mexico Environment Department Air Quality Bureau Permits Section 525 Camino de los Marquez, Suite 1 Santa Fe, New Mexico, 87505 Phone: (505) 476-4300 Fax: (505) 476-4375 www.env.nm.gov/aqb		

Universal Air Quality Permit Application

Use this application for NOI, NSR, or Title V sources.

Use this application for: the initial application, modifications, technical revisions, and renewals. For technical revisions, complete Sections, 1-A, 1-B, 2-E, 3, 9 and any other sections that are relevant to the requested action; coordination with the Air Quality Bureau permit staff prior to submittal is encouraged to clarify submittal requirements and to determine if more or less than these sections of the application are needed. Use this application for streamline permits as well.

This application is submitted as (check all that apply)**:** ☐ Request for a No Permit Required Determination (no fee)
☐ **Updating** an application currently under NMED review. Include this page and all pages that are being updated (no fee required).
Construction Status: ☐ Not Constructed ☐ Existing Permitted (or NOI) Facility ☐ Existing Non-permitted (or NOI) Facility
Minor Source: ☐ a NOI 20.2.73 NMAC ☐ 20.2.72 NMAC application or revision ☐ 20.2.72.300 NMAC Streamline application
Title V Source: ☐ Title V (new) ☐ Title V renewal ☑ TV minor mod. ☐ TV significant mod. TV Acid Rain: ☐ New ☐ Renewal
PSD Major Source: ☐ PSD major source (new) ☐ minor modification to a PSD source ☐ a PSD major modification

Acknowledgements:

☑ I acknowledge that a pre-application meeting is available to me upon request. ☑ Title V Operating, Title IV Acid Rain, and NPR applications have no fees.

☐ $500 NSR application Filing Fee enclosed OR ☐ The full permit fee associated with 10 fee points (required w/ streamline applications).

☐ Check No.: N/A in the amount of N/A

☑ I acknowledge the required submittal format for the hard copy application is printed double sided 'head-to-toe', 2-hole punched (except the Sect. 2 landscape tables is printed 'head-to-head'), numbered tab separators. Incl. a copy of the check on a separate page.

☐ I acknowledge there is an annual fee for permits in addition to the permit review fee: www.env.nm.gov/air-quality/permit-fees-2/.

☐ This facility qualifies for the small business fee reduction per 20.2.75.11.C. NMAC. The full $500.00 filing fee is included with this application and I understand the fee reduction will be calculated in the balance due invoice. The Small Business Certification Form has been previously submitted or is included with this application. (Small Business Environmental Assistance Program Information: www.env.nm.gov/air-quality/small-biz-eap-2/.)

Citation: Please provide the **low level citation** under which this application is being submitted: **20.2.70.404.B NMAC**
(e.g. application for a new minor source would be 20.2.72.200.A NMAC, one example for a Technical Permit Revision is 20.2.72.219.B.1.b NMAC, a Title V acid rain application would be: 20.2.70.200.C NMAC)

Section 1 – Facility Information

Section 1-A: Company Information

		AI # if known (see 1st 3 to 5 #s of permit IDEA ID No.): 220	Updating Permit/NOI #: P064-R4
1	Facility Name: Washington Ranch Storage Facility	Plant primary SIC Code (4 digits): 4922	
		Plant NAIC code (6 digits): 486210	
a	Facility Street Address (If no facility street address, provide directions from a prominent landmark): Take US-180 W for 5.4 miles from Whites City. Turn right onto Co Rd 418, Washington Rancho Road. Stay on Co Rd 418, Washington Ranch Road for 5.1 miles.		
2	Plant Operator Company Name: El Paso Natural Gas Company, LLC	Phone/Fax: 719-520-4600/ N/A	
a	Plant Operator Address: 2 N Nevada Ave, Colorado Springs, CO 80903		

b	Plant Operator's New Mexico Corporate ID or Tax ID: 46-0809216	
3	Plant Owner(s) name(s): El Paso Natural Gas Company, LLC	Phone/Fax: 719-520-4600/ N/A
a	Plant Owner(s) Mailing Address(s): 2 N Nevada Ave, Colorado Springs, CO 80903	
4	Bill To (Company): El Paso Natural Gas Company, LLC	Phone/Fax: (713) 420-1841/ N/A
a	Mailing Address: 1001 Louisiana, Suite 1000, Houston, TX 77002	E-mail: Ricardo_Duarte@KinderMorgan.com
5	☑ Preparer: Trinity Consultants ☑ Consultant: Adam Erenstein	Phone/Fax: (505) 266-6611 / N/A
a	Mailing Address: 9400 Holly Ave NE Bldg. 3 Suite B, Albuquerque, NM 87122	E-mail: aerenstein@trinityconsultants.com
6	Plant Operator Contact: Richard Najera	Phone/Fax: (575) 234-5407 / N/A
a	Address: 4305 National Park Highway, Carlsbad, NM 88220	E-mail: Richard_Najera@kindermorgan.com
7	Air Permit Contact: Richard Duarte	Title: Senior EHS Manager
a	E-mail: Ricardo_Duarte@KinderMorgan.com	Phone/Fax: (505) 831-7763/(505) 831-7734
b	Mailing Address: 7445 Pan American Freeway, Ste 202, Albuquerque, NM 87109	
c	The designated Air permit Contact will receive all official correspondence (i.e. letters, permits) from the Air Quality Bureau.	

Section 1-B: Current Facility Status

1.a	Has this facility already been constructed? ☑ Yes ☐ No	1.b If yes to question 1.a, is it currently operating in New Mexico? ☑ Yes ☐ No
2	If yes to question 1.a, was the existing facility subject to a Notice of Intent (NOI) (20.2.73 NMAC) before submittal of this application? ☐ Yes ☑ No	If yes to question 1.a, was the existing facility subject to a construction permit (20.2.72 NMAC) before submittal of this application? ☑ Yes ☐ No
3	Is the facility currently shut down? ☐ Yes ☑ No	If yes, give month and year of shut down (MM/YY): N/A
4	Was this facility constructed before 8/31/1972 and continuously operated since 1972? ☐ Yes ☑ No	
5	If Yes to question 3, has this facility been modified (see 20.2.72.7.P NMAC) or the capacity increased since 8/31/1972? ☐Yes ☐No ☑N/A	
6	Does this facility have a Title V operating permit (20.2.70 NMAC)? ☑ Yes ☐ No	If yes, the permit No. is: P-006-R3
7	Has this facility been issued a No Permit Required (NPR)? ☐ Yes ☑ No	If yes, the NPR No. is: N/A
8	Has this facility been issued a Notice of Intent (NOI)? ☐ Yes ☐ No	If yes, the NOI No. is: N/A
9	Does this facility have a construction permit (20.2.72/20.2.74 NMAC)? ☐ Yes ☐ No	If yes, the permit No. is: 0428-M7-R6
10	Is this facility registered under a General permit (GCP-1, GCP-2, etc.)? ☐ Yes ☑ No	If yes, the register No. is: N/A

Section 1-C: Facility Input Capacity & Production Rate

1	What is the facility's maximum input capacity, specify units (reference here and list capacities in Section 20, if more room is required)			
a	Current	Hourly:	Daily:	Annually:
b	Proposed	Hourly:	Daily:	Annually:
2	What is the facility's maximum production rate, specify units (reference here and list capacities in Section 20, if more room is required)			
a	Current	Hourly:	Daily:	Annually:

b	Proposed	Hourly:	Daily:	Annually:

Section 1-D: Facility Location Information

1	Section:	Range:	Township:	County: Eddy	Elevation (ft):
2	UTM Zone: ☐ 12 or ☐13			Datum: ☐ NAD 27 ☐ NAD 83 ☐ WGS 84	
a	UTM E (in meters, to nearest 10 meters):			UTM N (in meters, to nearest 10 meters):	
b	**AND** Latitude (deg., min., sec.):			Longitude (deg., min., sec.):	
3	Name and zip code of nearest New Mexico town:				
4	Detailed Driving Instructions from nearest NM town (attach a road map if necessary):				
5					
6	Status of land at facility (check one): ☐ Private ☐ Indian/Pueblo ☐ Federal BLM ☐ Federal Forest Service ☐ Other (specify)				
7	List all municipalities, Indian tribes, and counties within a ten (10) mile radius (20.2.72.203.B.2 NMAC) of the property on which the facility is proposed to be constructed or operated:				
8	**20.2.72** NMAC applications **only**: Will the property on which the facility is proposed to be constructed or operated be closer than 50 km (31 miles) to other states, Bernalillo County, or a Class I area (see www.env.nm.gov/air-quality/modeling-publications/)? ☐Yes ☐ No (20.2.72.206.A.7 NMAC) If yes, list all with corresponding distances in kilometers:				
9	Name nearest Class I area:				
10	Shortest distance (in km) from facility boundary to the boundary of the nearest Class I area (to the nearest 10 meters):				
11	Distance (meters) from the perimeter of the Area of Operations (AO is defined as the plant site inclusive of all disturbed lands, including mining overburden removal areas) to nearest residence, school or occupied structure:				
12	Method(s) used to delineate the Restricted Area: "**Restricted Area**" is an area to which public entry is effectively precluded. Effective barriers include continuous fencing, continuous walls, or other continuous barriers approved by the Department, such as rugged physical terrain with steep grade that would require special equipment to traverse. If a large property is completely enclosed by fencing, a restricted area within the property may be identified with signage only. Public roads cannot be part of a Restricted Area.				
13	Does the owner/operator intend to operate this source as a portable stationary source as defined in 20.2.72.7.X NMAC? ☐ Yes ☐ No A portable stationary source is not a mobile source, such as an automobile, but a source that can be installed permanently at one location or that can be re-installed at various locations, such as a hot mix asphalt plant that is moved to different job sites.				
14	Will this facility operate in conjunction with other air regulated parties on the same property? ☐ No ☐ Yes If yes, what is the name and permit number (if known) of the other facility?				

Section 1-E: Proposed Operating Schedule (The 1-E.1 & 1-E.2 operating schedules may become conditions in the permit.)

1	Facility **maximum** operating ($\frac{hours}{day}$):	($\frac{days}{week}$):	($\frac{weeks}{year}$):	($\frac{hours}{year}$):		
2	Facility's maximum daily operating schedule (if less than 24 $\frac{hours}{day}$)? Start:		☐AM ☐PM	End:	☐AM ☐PM	
3	Month and year of anticipated start of construction:					
4	Month and year of anticipated construction completion:					
5	Month and year of anticipated startup of new or modified facility:					
6	Will this facility operate at this site for more than one year? ☐ Yes ☐ No					

Section 1-F: Other Facility Information

1	Are there any current Notice of Violations (NOV), compliance orders, or any other compliance or enforcement issues related to this facility? ☐ Yes ☐ No If yes, specify:		
a	If yes, NOV date or description of issue: N/A		NOV Tracking No: N/A
b	Is this application in response to any issue listed in 1-F, 1 or 1a above? ☐ Yes ☐ No If Yes, provide the 1c & 1d info below:		
c	Document Title: N/A	Date: N/A	Requirement # (or page # and paragraph #): N/A
d	Provide the required text to be inserted in this permit:		
2	Is air quality dispersion modeling or modeling waiver being submitted with this application? ☐ Yes ☐ No		
3	Does this facility require an "Air Toxics" permit under 20.2.72.400 NMAC & 20.2.72.502, Tables A and/or B? ☐ Yes ☐ No		
4	Will this facility be a source of federal Hazardous Air Pollutants (HAP)? ☐ Yes ☐ No		
a	If Yes, what type of source? ☐ **Major** (☐ ≥10 tpy of any single HAP **OR** ☐ ≥25 tpy of any combination of HAPS) **OR** ☐ **Minor** (☐ <10 tpy of any single HAP **AND** ☐ <25 tpy of any combination of HAPS)		
5	Is any unit exempt under 20.2.72.202.B.3 NMAC? ☐ Yes ☐ No		
a	If yes, include the name of company providing commercial electric power to the facility: _____ Commercial power is purchased from a commercial utility company, which specifically does not include power generated on site for the sole purpose of the user.		

Section 1-G: Streamline Application (This section applies to 20.2.72.300 NMAC Streamline applications only)

1	☐ I have filled out Section 18, "Addendum for Streamline Applications."	☑ N/A (This is not a Streamline application.)

Section 1-H: Current Title V Information - Required for all applications from TV Sources

(Title V-source required information for all applications submitted pursuant to 20.2.72 NMAC (Minor Construction Permits), or 20.2.74/20.2.79 NMAC (Major PSD/NNSR applications), and/or 20.2.70 NMAC (Title V))

1	Responsible Official (R.O.) (20.2.70.300.D.2 NMAC): Heriberto Carreon	Phone: (806) 354-3108
a	R.O. Title: Director-Operations Division 4	R.O. e-mail: Heriberto_carreon@kindermorgan.com
b	R. O. Address: 4711 S. Western, Amarillo, TX 79109	
2	Alternate Responsible Official (20.2.70.300.D.2 NMAC): N/A	Phone: N/A
a	A. R.O. Title: N/A	A. R.O. e-mail:N/A
b	A. R. O. Address: N/A	
3	Company's Corporate or Partnership Relationship to any other Air Quality Permittee (List the names of any companies that have operating (20.2.70 NMAC) permits and with whom the applicant for this permit has a corporate or partnership relationship): N/A	
4	Name of Parent Company ("Parent Company" means the primary name of the organization that owns the company to be permitted wholly or in part.): N/A	
a	Address of Parent Company: N/A	
5	Names of Subsidiary Companies ("Subsidiary Companies" means organizations, branches, divisions or subsidiaries, which are owned, wholly or in part, by the company to be permitted.): N/A	
6	Telephone numbers & names of the owners' agents and site contacts familiar with plant operations: N/A	
7	Affected Programs to include Other States, local air pollution control programs (i.e. Bernalillo) and Indian tribes: Will the property on which the facility is proposed to be constructed or operated be closer than 80 km (50 miles) from other states, local pollution control programs, and Indian tribes and pueblos (20.2.70.402.A.2 and 20.2.70.7.B)? If yes, state which ones and provide the distances in kilometers: N/A	

Section 1-I – Submittal Requirements

Each 20.2.73 NMAC (**NOI**), a 20.2.70 NMAC (**Title V**), a 20.2.72 NMAC (**NSR** minor source), or 20.2.74 NMAC (**PSD**) application package shall consist of the following:

Hard Copy Submittal Requirements:

1) One hard copy **original signed and notarized application package** **printed double sided** **'head-to-toe'** **2-hole punched** as we bind the document on top, not on the side; except Section 2 (landscape tables), which should be head-to-head. Please use **numbered tab separators** in the hard copy submittal(s) as this facilitates the review process. For NOI submittals only, hard copies of UA1, Tables 2A, 2D & 2F, Section 3 and the signed Certification Page are required. Please include a copy of the check on a separate page.

2) If the application is for a minor NSR, PSD, NNSR, or Title V application, include one working hard **copy** for Department use. This copy should be printed in book form, 3-hole punched, and **must be double sided**. Note that this is in addition to the head-to-to 2-hole punched copy required in 1) above. Minor NSR Technical Permit revisions (20.2.72.219.B NMAC) only need to fill out Sections 1-A, 1-B, 3, and should fill out those portions of other Section(s) relevant to the technical permit revision. TV Minor Modifications need only fill out Sections 1-A, 1-B, 1-H, 3, and those portions of other Section(s) relevant to the minor modification. NMED may require additional portions of the application to be submitted, as needed.

3) The entire NOI or Permit application package, including the full modeling study, should be submitted electronically. Electronic files for applications for NOIs, any type of General Construction Permit (GCP), or technical revisions to NSRs must be submitted with compact disk (CD) or digital versatile disc (DVD). For these permit application submittals, **two** CD copies are required (in sleeves, not crystal cases, please), with additional CD copies as specified below. NOI applications require only a single CD submittal. Electronic files for other New Source Review (construction) permits/permit modifications or Title V permits/permit modifications can be submitted on CD/DVD or sent through AQB's secure file transfer service.

Electronic files sent by (check one):

☐ CD/DVD attached to paper application

☑ secure electronic transfer. Air Permit Contact Name Adam Erenstein, Email aerenstein@trinityconsultants.com Phone number (505)266-6611.

a. If the file transfer service is chosen by the applicant, after receipt of the application, the Bureau will email the applicant with instructions for submitting the electronic files through a secure file transfer service. Submission of the electronic files through the file transfer service needs to be completed within 3 business days after the invitation is received, so the applicant should ensure that the files are ready when sending the hard copy of the application. The applicant will not need a password to complete the transfer. **Do not use the file transfer service for NOIs, any type of GCP, or technical revisions to NSR permits.**

4) Optionally, the applicant may submit the files with the application on compact disk (CD) or digital versatile disc (DVD) following the instructions above and the instructions in 5 for applications subject to PSD review.

5) If **air dispersion modeling** is required by the application type, include the **NMED Modeling Waiver** and/or electronic air dispersion modeling report, input, and output files. The dispersion modeling ***summary report only*** should be submitted as hard copy(ies) unless otherwise indicated by the Bureau.

6) If the applicant submits the electronic files on CD and the application is subject to PSD review under 20.2.74 NMAC (PSD) or NNSR under 20.2.79 NMC include,
   a. one additional CD copy for US EPA,
   b. one additional CD copy for each federal land manager affected (NPS, USFS, FWS, USDI) and,
   c. one additional CD copy for each affected regulatory agency other than the Air Quality Bureau.

   If the application is submitted electronically through the secure file transfer service, these extra CDs do not need to be submitted.

Electronic Submittal Requirements [in addition to the required hard copy(ies)]:

1) All required electronic documents shall be submitted as 2 separate CDs or submitted through the AQB secure file transfer service. Submit a single PDF document of the entire application as submitted and the individual documents comprising the application.

2) The documents should also be submitted in Microsoft Office compatible file format (Word, Excel, etc.) allowing us to access the text and formulas in the documents (copy & paste). Any documents that cannot be submitted in a Microsoft Office compatible format shall be saved as a PDF file from within the electronic document that created the file. If you are unable to provide Microsoft office compatible electronic files or internally generated PDF files of files (items that were not created electronically:

i.e. brochures, maps, graphics, etc,), submit these items in hard copy format. We must be able to review the formulas and inputs that calculated the emissions.

3) It is preferred that this application form be submitted as 4 electronic files (3 MSWord docs: Universal Application section 1 [UA1], Universal Application section 3-19 [UA3], and Universal Application 4, the modeling report [UA4]) and 1 Excel file of the tables (Universal Application section 2 [UA2]). Please include as many of the 3-19 Sections as practical in a single MS Word electronic document. Create separate electronic file(s) if a single file becomes too large or if portions must be saved in a file format other than MS Word.

4) The electronic file names shall be a maximum of 25 characters long (including spaces, if any). The format of the electronic Universal Application shall be in the format: "A-3423-FacilityName". The "A" distinguishes the file as an application submittal, as opposed to other documents the Department itself puts into the database. Thus, all electronic application submittals should begin with "A-". Modifications to existing facilities should use the core permit number (i.e. '3423') the Department assigned to the facility as the next 4 digits. Use 'XXXX' for new facility applications. The format of any separate electronic submittals (additional submittals such as non-Word attachments, re-submittals, application updates) and Section document shall be in the format: "A-3423-9-description", where "9" stands for the section # (in this case Section 9-Public Notice). Please refrain, as much as possible, from submitting any scanned documents as this file format is extremely large, which uses up too much storage capacity in our database. Please take the time to fill out the header information throughout all submittals as this will identify any loose pages, including the Application Date (date submitted) & Revision number (0 for original, 1, 2, etc.; which will help keep track of subsequent partial update(s) to the original submittal. Do not use special symbols (#, @, etc.) in file names. The footer information should not be modified by the applicant.

Table of Contents

Table 2-A: Regulated Emission Sources

Unit and stack numbering must correspond throughout the application package. If applying for a NOI under 20.2.73 NMAC, equipment exemptions under 2.72.202 NMAC do not apply.

Unit Number[1]	Source Description	Make	Model #	Serial #	Manufact-urer's Rated Capacity[3] (Specify Units)	Requested Permitted Capacity[3] (Specify Units)	Date of Manufacture[2]	Date of Construction/ Reconstruction[2]	Controlled by Unit #	Emissions vented to Stack #	Source Classi-fication Code (SCC)	For Each Piece of Equipment, Check One	RICE Ignition Type (CI, SI, 4SLB, 4SRB, 2SLB)[4]	Replacing Unit No.
1	Compressor Engine	Cooper-Bessemer	12Q155 HC2	48833	4,500 hp	4,500 hp	Unknown	6/1/1982	N/A	1	20200202	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
2	Compressor Engine	Cooper-Bessemer	12Q155 HC2	48834	4,500 hp	4,500 hp	Unknown	6/1/1982	N/A	2	20200202	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
3a	Glycol Dehydrator Reboiler	Lakota Eng Systems	N/A	4150-02	3 MMBtu/hr	3 MMBtu/hr	Unknown	6/1/1982	N/A	3a	31000228	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced		
3b	Glycol Dehydrator Regenerator	N/A	N/A	N/A	250 MMscf/d	250 MMscf/d	Unknown	N/A	6	3b	31000227	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced		
4	Gas Heater	Lakota Eng Systems	N/A	2116-01	6 MMBtu/hr	6 MMBtu/hr	Unknown	6/1/1982	N/A	4	31000404	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
6	Process Flare	Flare Industries	660	N/A	710.9 lb/hr	710.9 lb/hr	2002	7/1/2004	N/A	6	30600903	☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☑ To Be Modified ☐ To be Replaced		
FUG	Facility-Wide Fugitive Emissions	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	31088811	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
SSM/M 1	Startup, Shutdown	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	31088811	☑ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
												☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
												☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
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												☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		
												☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced		

[1] Unit numbers must correspond to unit numbers in the previous permit unless a complete cross reference table of all units in both permits is provided.

[2] Specify dates required to determine regulatory applicability.

[3] To properly account for power conversion efficiencies, generator set rated capacity shall be reported as the rated capacity of the engine in horsepower, not the kilowatt capacity of the generator set.

[4] "4SLB" means four stroke lean burn engine, "4SRB" means four stroke rich burn engine, "2SLB" means two stroke lean burn engine, "CI" means compression ignition, and "SI" means spark ignition

Table 2-B: Insignificant Activities[1] (20.2.70 NMAC) OR Exempted Equipment (20.2.72 NMAC)

All 20.2.70 NMAC (Title V) applications must list all Insignificant Activities in this table. All 20.2.72 NMAC applications must list Exempted Equipment in this table. If equipment listed on this table is exempt under 20.2.72.202.B.5, include emissions calculations and emissions totals for 202.B.5 "similar functions" units, operations, and activities in Section 6, Calculations. Equipment and activities exempted under 20.2.72.202 NMAC may not necessarily be Insignificant under 20.2.70 NMAC (and vice versa). Unit & stack numbering must be consistent throughout the application package. Per Exemptions Policy 02-012.00 (see http://www.env.nm.gov/aqb/permit/aqb_pol.html), 20.2.72.202.B NMAC Exemptions do not apply, but 20.2.72.202.A NMAC exemptions do apply to NOI facilities under 20.2.73 NMAC. List 20.2.72.301.D.4 NMAC Auxiliary Equipment for Streamline applications in Table 2-A. The List of Insignificant Activities (for TV) can be found online at https://www.env.nm.gov/wp-content/uploads/sites/2/2017/10/InsignificantListTitleV.pdf. TV sources may elect to enter both TV Insignificant Activities and Part 72 Exemptions on this form.

Unit Number	Source Description	Manufacturer	Model No.	Max Capacity	List Specific 20.2.72.202 NMAC Exemption (e.g. 20.2.72.202.B.5)	Date of Manufacture /Reconstruction[2]	For Each Piece of Equipment, Check Onc
			Serial No.	Capacity Units	Insignificant Activity citation (e.g. IA List Item #1.a)	Date of Installation /Construction[2]	
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced
							☐ Existing (unchanged) ☐ To be Removed ☐ New/Additional ☐ Replacement Unit ☐ To Be Modified ☐ To be Replaced

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[1] Insignificant activities exempted due to size or production rate are defined in 20.2.70.300.D.6, 20.2.70.7.Q NMAC, and the NMED/AQB List of Insignificant Activities, dated September 15, 2008. Emissions from these insignificant activities do not need to be reported, unless specifically requested.

[2] Specify date(s) required to determine regulatory applicability.

Table 2-C: Emissions Control Equipment

Unit and stack numbering must correspond throughout the application package. Only list control equipment for TAPs if the TAP's maximum uncontrolled emissions rate is over its respective threshold as listed in 20.2.72 NMAC, Subpart V, Tables A and B. In accordance with 20.2.72.203.A(3) and (8) NMAC, 20.2.70.300.D(5)(b) and (e) NMAC, and 20.2.73.200.B(7) NMAC, the permittee shall report all control devices and list each pollutant controlled by the control device regardless if the applicant takes credit for the reduction in emissions.

Control Equipment Unit No.	Control Equipment Description	Date Installed	Controlled Pollutant(s)	Controlling Emissions for Unit Number(s)[1]	Efficiency (% Control by Weight)	Method used to Estimate Efficiency
6	Process Flare Used for controlling emissions from Unit 3b (Noncondensable Regenerator Overheads)	07/2004	VOC, HAPs	3b (Noncondensable Regenerator Overheads)	98%	Engineering Estimate

[1] List each control device on a separate line. For each control device, list all emission units controlled by the control device.

Table 2-D: Maximum Emissions (under normal operating conditions)

☐ **This Table was intentionally left blank because it would be identical to Table 2-E.**

Maximum Emissions are the emissions at maximum capacity and prior to (in the absence of) pollution control, emission-reducing process equipment, or any other emission reduction. Calculate the hourly emissions using the worst case hourly emissions for each pollutant. For each pollutant, calculate the annual emissions as if the facility were operating at maximum plant capacity without pollution controls for 8760 hours per year, unless otherwise approved by the Department. List Hazardous Air Pollutants (HAP) & Toxic Air Pollutants (TAPs) in Table 2-I. Unit & stack numbering must be consistent throughout the application package. Fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or 1.41E-4).

Unit No.	NOx		CO		VOC		SOx		PM[1]		PM10[1]		PM2.5[1]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1	27.28	119.50	27.28	119.50	19.84	86.91	0.48	2.08	-	-	1.12	4.92	1.12	4.92	-	-	-	-
2	27.28	119.50	27.28	119.50	19.84	86.91	0.48	2.08	-	-	1.12	4.92	1.12	4.92	-	-	-	-
3a	0.31	1.37	0.26	1.15	0.017	0.075	0.045	0.2	-	-	0.024	0.10	0.024	0.10	-	-	-	-
3b	-	-	-	-	19.59	85.8	-	-	-	-	-	-	-	-	-	-	-	-
4	0.63	2.78	0.53	2.33	0.035	0.15	0.091	0.40	-	-	0.048	0.21	0.048	0.21	-	-	-	-
6	0.012	0.05	0.023	0.10	-	-	6.29E-04	2.75E-03	-	-	-	-	-	-	-	-	-	-
FUG	-	-	-	-	*	1.11	-	-	-	-	-	-	-	-	-	-	-	-
Totals	55.52	243.19	55.38	242.57	59.33	260.96	1.09	4.76	-	-	2.32	10.15	2.32	10.15				

[1]**Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5. Particulate matter (PM) is not subject to an ambient air quality standard, but PM is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

Table 2-E: Requested Allowable Emissions

Unit & stack numbering must be consistent throughout the application package. Fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or 1.41E^{-4}).

Unit No.	NOx		CO		VOC		SOx		PM[1]		PM10[1]		PM2.5[1]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1	27.28	119.50	27.28	119.5	19.84	86.91	0.48	2.08	-	-	1.12	4.92	1.12	4.92	-	-	-	-
2	27.28	119.50	27.28	119.5	19.84	86.91	0.48	2.08	-	-	1.12	4.92	1.12	4.92	-	-	-	-
3a	0.31	1.37	0.26	1.15	0.017	0.075	0.045	0.20	-	-	0.024	0.10	0.024	0.10	-	-	-	-
3b[2]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	0.63	2.78	0.53	2.33	0.035	0.15	0.091	0.40	-	-	0.048	0.21	0.048	0.21	-	-	-	-
6	0.10	0.44	0.20	0.88	0.22	0.98	6.29E-04	2.75E-03	-	-	-	-	-	-	-	-	-	-
FUG	-	-	-	-	*	1.11	-	-	-	-	-	-	-	-	-	-	-	-
Totals	55.61	243.58	55.56	243.36	39.96	176.13	1.09	4.76	-	-	2.32	10.15	2.32	10.15				

[1] **Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5. Particulate matter (PM) is not subject to an ambient air quality standard, but it is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

[2] Dehydrator condenser still vent vapors are routed to the process flare (Unit 6) for destruction; emissions are represented at that unit. Dehydrator flash tank emissions are routed to the reboiler to be used as fuel. In a controlled scenario, there are no emissions from unit 3b.

Table 2-F: Additional Emissions during Startup, Shutdown, and Routine Maintenance (SSM)

☐ This table is intentionally left blank since all emissions at this facility due to routine or predictable startup, shutdown, or scehduled maintenance are no higher than those listed in Table 2-E and a malfunction emission limit is not already permitted or requested. If you are required to report GHG emissions as described in Section 6a, include any GHG emissions during Startup, Shutdown, and/or Scheduled Maintenance (SSM) in Table 2-P. Provide an explanations of SSM emissions in Section 6 and 6a.

All applications for facilities that have emissions during routine our predictable startup, shutdown or scheduled maintenance (SSM)[1], including NOI applications, must include in this table the Maximum Emissions during routine or predictable startup, shutdown and scheduled maintenance (20.2.7 NMAC, 20.2.72.203.A.3 NMAC, 20.2.73.200.D.2 NMAC). In Section 6 and 6a, provide emissions calculations for all SSM emissions reported in this table. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (https://www.env.nm.gov/aqb/permit/aqb_pol.html) for more detailed instructions. Numbers shall be expressed to at least 2 decimal points (e.g. 0.41, 1.41, or 1.41E-4).

Unit No.	NOx		CO		VOC		SOx		PM[2]		PM10[2]		PM2.5[2]		H_2S		Lead	
	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
SSM/M1[3]	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-
Totals	-	-	-	-	-	10	-	-	-	-	-	-	-	-	-	-	-	-

[1] **For instance**, if the short term steady-state Table 2-E emissions are 5 lb/hr and the SSM rate is 12 lb/hr, enter 7 lb/hr in this table. If the annual steady-state Table 2-E emissions are 21.9 TPY, and the number of scheduled SSM events result in annual emissions of 31.9 TPY, enter 10.0 TPY in the table below.

[2] **Condensable Particulate Matter:** Include condensable particulate matter emissions for PM10 and PM2.5 if the source is a combustion source. Do not include condensable particulate matter for PM unless PM is set equal to PM10 and PM2.5. Particulate matter (PM) is not subject to an ambient air quality standard, but it is a regulated air pollutant under PSD (20.2.74 NMAC) and Title V (20.2.70 NMAC).

[3] Consideration of SSM emissions according to NMED guidance (Implementation Guidance for Permitting SSM Emissions and Excess Emissions, June 7, 2012) demonstrates that consolidating VOC emissions from SSM and upset/malfunction conditions to a maximum 10 tpy per pollutant would not trigger any additional requirements. Kinder Morgan has requested that both routine and predictable startup and shutdown events and malfunction events be combined with a limit of 10 tpy of VOC.

Table 2-G: Stack Exit and Fugitive Emission Rates for Special Stacks

☐ I have elected to leave this table blank because this facility does not have any stacks/vents that split emissions from a single source or combine emissions from more than one source listed in table 2-A. Additionally, the emission rates of all stacks match the Requested allowable emission rates stated in Table 2-E.

Use this table to list stack emissions (requested allowable) from split and combined stacks. List Toxic Air Pollutants (TAPs) and Hazardous Air Pollutants (HAPs) in Table 2-I. List all fugitives that are associated with the normal, routine, and non-emergency operation of the facility. Unit and stack numbering must correspond throughout the application package. Refer to Table 2-E for instructions on use of the "-" symbol and on significant figures.

Stack No.	Serving Unit Number(s) from Table 2-A	NOx		CO		VOC		SOx		PM		PM10		PM2.5		☐ H_2S or ☐ Lead	
		lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
Totals:																	

Table 2-H: Stack Exit Conditions

Unit and stack numbering must correspond throughout the application package. Include the stack exit conditions for each unit that emits from a stack, including blowdown venting parameters and tank emissions. If the facility has multiple operating scenarios, complete a separate Table 2-H for each scenario and, for each, type scenario name here:

Stack Number	Serving Unit Number(s) from Table 2-A	Orientation (H-Horizontal V=Vertical)	Rain Caps (Yes or No)	Height Above Ground (ft)	Temp. (F)	Flow Rate		Moisture by Volume (%)	Velocity (ft/sec)	Inside Diameter (ft)
						(acfs)	(dscfs)			
1	1	V	No	42	540	431		N/A	51	3.27
2	2	V	No	42	540	431		N/A	51	3.27
3a	3	V	No	30	600	20		N/A	26	1.00
3b*	3	V	No	*	*	*		*	*	*
4	4	V	No	60	600	41		N/A	13	2.00
6	3b,6	V	No	25	1832	13.00		N/A	65.60	0.50

* Dehydrator condenser still vent vapors are routed to the process flare (Unit 6) for destruction; emissions are represented at that unit. Dehydrator flash tank emissions are routed to the reboiler to be used as fuel. In a controlled scenario, there are no emission from unit 3b.

Table 2-I: Stack Exit and Fugitive Emission Rates for HAPs and TAPs

In the table below, report the Potential to Emit for each HAP from each regulated emission unit listed in Table 2-A, only if the entire facility emits the HAP at a rate greater than or equal to one (1) ton per year For each such emission unit, HAPs shall be reported to the nearest 0.1 tpy. Each facility-wide Individual HAP total and the facility-wide Total HAPs shall be the sum of all HAP sources calculated to the nearest 0.1 ton per year. Per 20.2.72.403.A.1 NMAC, facilities not exempt [see 20.2.72.402.C NMAC] from TAP permitting shall report each TAP that has an uncontrolled emission rate in excess of its pounds per hour screening level specified in 20.2.72.502 NMAC. TAPs shall be reported using one more significant figure than the number of significant figures shown in the pound per hour threshold corresponding to the substance. Use the HAP nomenclature as it appears in Section 112 (b) of the 1990 CAAA and the TAP nomenclature as it listed in 20.2.72.502 NMAC. Include tank-flashing emissions estimates of HAPs in this table. For each HAP or TAP listed, fill all cells in this table with the emission numbers or a "-" symbol. A "-" symbol indicates that emissions of this pollutant are not expected or the pollutant is emitted in a quantity less than the threshold amounts described above.

Stack No.	Unit No.(s)	Total HAPs		Formaldehyde ☑ HAP or ☐ TAP		Acrolein ☑ HAP or ☐ TAP		n-hexane ☑ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP		Provide Pollutant Name Here ☐ HAP or ☐ TAP	
		lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1	1	3.67	16.09	3.22	14.1	0.22	0.98	0.029	0.13										
2	2	3.67	16.09	3.22	14.1	0.22	0.98	0.029	0.13										
3a	3a	5.39E-03	0.024	1.31E-03	5.75E-03	-	-	1.20E-03	5.25E-03										
3b[1]	3b[1]	-	-	-	-	-	-	-	-										
4	4	0.11	0.47	6.34E-03	0.028	-	-	0.011	0.046										
6	6	0.075	0.33	-	-	-	-	-	-										
FUG	FUG	*	0.024	-	-	-	-	-	-										
Totals:		7.53	33.03	6.45	28.23	0.44	1.96	0.070	0.31										

[1] Dehydrator condenser still vent vapors are routed to the process flare (Unit 6) for destruction; emissions are represented at that unit. Dehydrator flash tank emissions are routed to the reboiler to be used as fuel. In a controlled scenario, there are no emissions from unit 3b.

Table 2-J: Fuel

Specify fuel characteristics and usage. Unit and stack numbering must correspond throughout the application package.

Unit No.	Fuel Type (low sulfur Diesel, ultra low sulfur diesel, Natural Gas, Coal, …)	Fuel Source: purchased commercial, pipeline quality natural gas, residue gas, raw/field natural gas, process gas (e.g. SRU tail gas) or other	Specify Units				
			Lower Heating Value	Hourly Usage	Annual Usage	% Sulfur	% Ash
1	Natural Gas	Pipeline quality sweet natural gas	947 Btu/scf	33.3 Mscf	291.4 MMscf	5 gr S/100 scf	Neg.
2	Natural Gas	Pipeline quality sweet natural gas	947 Btu/scf	33.3 Mscf	291.4 MMscf	5 gr S/100 scf	Neg.
3a	Natural Gas	Pipeline quality sweet natural gas	959 Btu/scf	3.1 Mscf	27.4 MMscf	5 gr S/100 scf	Neg.
4	Natural Gas	Pipeline quality sweet natural gas	947 Btu/scf	6.3 Mscf	55.5 MMscf	5 gr S/100 scf	Neg.
6	Natural Gas	Pipeline quality sweet natural gas	947 Btu/scf	88 scf	0.77 MMscf	5 gr S/100 scf	Neg.

Table 2-K: Liquid Data for Tanks Listed in Table 2-L

For each tank, list the liquid(s) to be stored in each tank. If it is expected that a tank may store a variety of hydrocarbon liquids, enter "mixed hydrocarbons" in the Composition column for that tank and enter the corresponding data of the most volatile liquid to be stored in the tank. If tank is to be used for storage of different materials, list all the materials in the "All Calculations" attachment, run the newest version of TANKS on each, and use the material with the highest emission rate to determine maximum uncontrolled and requested allowable emissions rate. The permit will specify the most volatile category of liquids that may be stored in each tank. Include appropriate tank-flashing modeling input data. Use additional sheets if necessary. Unit and stack numbering must correspond throughout the application package.

Tank No.	SCC Code	Material Name	Composition	Liquid Density (lb/gal)	Vapor Molecular Weight (lb/lb*mol)	Average Storage Conditions		Max Storage Conditions	
						Temperature (°F)	True Vapor Pressure (psia)	Temperature (°F)	True Vapor Pressure (psia)

Table 2-L: Tank Data

Include appropriate tank-flashing modeling input data. Use an addendum to this table for unlisted data categories. Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary. See reference Table 2-L2. Note: 1.00 bbl = 10.159 M3 = 42.0 gal

Tank No.	Date Installed	Materials Stored	Seal Type (refer to Table 2-LR below)	Roof Type (refer to Table 2-LR below)	Capacity		Diameter (M)	Vapor Space (M)	Color (from Table VI-C)		Paint Condition (from Table VI-C)	Annual Throughput (gal/yr)	Turn-overs (per year)
					(bbl)	(M^3)			Roof	Shell			

Table 2-L2: Liquid Storage Tank Data Codes Reference Table

Roof Type	Seal Type, Welded Tank Seal Type		Seal Type, Riveted Tank Seal Type		Roof, Shell Color	Paint Condition
FX: Fixed Roof	**Mechanical Shoe Seal**	**Liquid-mounted resilient seal**	**Vapor-mounted resilient seal**	**Seal Type**	**WH**: White	Good
IF: Internal Floating Roof	**A**: Primary only	**A**: Primary only	**A**: Primary only	**A**: Mechanical shoe, primary only	**AS**: Aluminum (specular)	Poor
EF: External Floating Roof	**B**: Shoe-mounted secondary	**B**: Weather shield	**B**: Weather shield	**B**: Shoe-mounted secondary	**AD**: Aluminum (diffuse)	
P: Pressure	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**C**: Rim-mounted secondary	**LG**: Light Gray	
					MG: Medium Gray	
					BL: Black	
					OT: Other (specify)	

Note: 1.00 bbl = 0.159 M^3 = 42.0 gal

Table 2-M: Materials Processed and Produced (Use additional sheets as necessary.)

Material Processed				Material Produced			
Description	**Chemical Composition**	**Phase (Gas, Liquid, or Solid)**	**Quantity (specify units)**	**Description**	**Chemical Composition**	**Phase**	**Quantity (specify units)**

Table 2-N: CEM Equipment

Enter Continuous Emissions Measurement (CEM) Data in this table. If CEM data will be used as part of a federally enforceable permit condition, or used to satisfy the requirements of a state or federal regulation, include a copy of the CEM's manufacturer specification sheet in the Information Used to Determine Emissions attachment. Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary.

Stack No.	Pollutant(s)	Manufacturer	Model No.	Serial No.	Sample Frequency	Averaging Time	Range	Sensitivity	Accuracy

Table 2-O: Parametric Emissions Measurement Equipment

Unit and stack numbering must correspond throughout the application package. Use additional sheets if necessary.

Unit No.	Parameter/Pollutant Measured	Location of Measurement	Unit of Measure	Acceptable Range	Frequency of Maintenance	Nature of Maintenance	Method of Recording	Averaging Time

Table 2-P: Greenhouse Gas Emissions

Applications submitted under 20.2.70, 20.2.72, & 20.2.74 NMAC are required to complete this Table. Power plants, Title V major sources, and PSD major sources must report and calculate all GHG emissions for each unit. Applicants must report potential emission rates in short tons per year (see Section 6.a for assistance). Include GHG emissions during Startup, Shutdown, and Scheduled Maintenance in this table. For minor source facilities that are not power plants, are not Title V, or are not PSD, there are three options for reporting GHGs 1) report GHGs for each individual piece of equipment; 2) report all GHGs from a group of unit types, for example report all combustion source GHGs as a single unit and all venting GHG as a second separate unit; OR 3) check the following box ☐ By checking this box, the applicant acknowledges the total CO2e emissions are less than 75,000 tons per year.

		CO_2 ton/yr	N_2O ton/yr	CH_4 ton/yr	SF_6 ton/yr	PFC/HFC ton/yr[2]									**Total GHG** Mass Basis ton/yr[4]	**Total CO_2e** ton/yr[5]
Unit No.	**GWPs [1]**	**1**	**298**	**25**	**22,800**	**footnote 3**										
1	**mass GHG**	16135	0.030	0.30	-	-									16135.33	
	CO_2e	16135	9.05	7.59	-	-										16151.64
2	**mass GHG**	16135	0.030	0.30	-	-									16135.33	
	CO_2e	16135	9.05	7.59	-	-										16151.64
3a	**mass GHG**	1537	2.89E-03	0.029	-	-									1537.0319	
	CO_2e	1537	0.86	0.72	-	-										1538.58
3b[6]	**mass GHG**	-	-	-	-	-										
	CO_2e	-	-	-	-	-										
4	**mass GHG**	3073	5.78E-03	0.058	-	-									3073.0638	
	CO_2e	3073	1.72	1.45	-	-										3076.17
6	**mass GHG**	350	9.50E-04	0.74	-	-									350.74095	
	CO_2e	350	2.83E-01	18.48	-	-										368.763
FUG	**mass GHG**	-	-	-	-	-										
	CO_2e	-	-	-	-	-										
SSM/M1	**mass GHG**	-	-	-	-	-										
	CO_2e	-	-	-	-	-										
	mass GHG															
	CO_2e															
	mass GHG															
	CO_2e															
	mass GHG															
	CO_2e															
	mass GHG															
	CO_2e															
Total	**mass GHG**	37230	0.070	1.43											37231.497	
	CO_2e	37230	20.96	35.83												37286.793

[1] **GWP** (Global Warming Potential): Applicants must use the most current GWPs codified in Table A-1 of 40 CFR part 98. GWPs are subject to change, therefore, applicants need to check 40 CFR 98 to confirm GWP values.

[2] For **HFCs** or **PFCs** describe the specific HFC or PFC compound and use a separate column for each individual compound.

[3] For each new compound, enter the appropriate GWP for each HFC or PFC compound from Table A-1 in 40 CFR 98.

[4] Green house gas emissions on a **mass basis** is the ton per year green house gas emission before adjustment with its GWP.

[5] **CO_2e** means Carbon Dioxide Equivalent and is calculated by multiplying the TPY mass emissions of the green house gas by its GWP.

[6] Dehydrator condenser still vent vapors are routed to the process flare (Unit 6) for destruction; emissions are represented at that unit. Dehydrator flash tank emissions are routed to the reboiler to be used as fuel. In a controlled scenario, there are no emissions from unit 3b.

Section 3

Application Summary

The **Application Summary** shall include a brief description of the facility and its process, the type of permit application, the applicable regulation (i.e. 20.2.72.200.A.X, or 20.2.73 NMAC) under which the application is being submitted, and any air quality permit numbers associated with this site. If this facility is to be collocated with another facility, provide details of the other facility including permit number(s). In case of a revision or modification to a facility, provide the lowest level regulatory citation (i.e. 20.2.72.219.B.1.d NMAC) under which the revision or modification is being requested. Also describe the proposed changes from the original permit, how the proposed modification will affect the facility's operations and emissions, de-bottlenecking impacts, and changes to the facility's major/minor status (both PSD & Title V).

The **Process Summary** shall include a brief description of the facility and its processes.

Startup, Shutdown, and Maintenance (SSM) routine or predictable emissions: Provide an overview of how SSM emissions are accounted for in this application. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on SSM emissions.

The Washington Ranch Storage Facility owned and operated El Paso Natural Gas Company, LLC. (EPNG), a Kinder Morgan Company, is a natural gas storage facility which compresses and injects natural gas into underground storage wells and withdraws the gas for delivery into the pipeline. The facility is located approximately 9 miles southwest of Whites City, New Mexico in Eddy County.

The facility is currently operating under operating permit: TV Permit: P064-R4 and NSR Permit:0428-M7-R6. This application is being submitted pursuant to 20.2.70.404.B NMAC for a Title V minor modification to address the proposed changes to the glycol dehydrator flash tank emissions which consist of recycling flash tank vapors from the glycol dehydrator to be used as fuel. This application will incorporate the changes reflected in NSR 0428-M7-R6 which includes changes to the glycol dehydrator flash tank emissions which consists of recycling flash tank vapors from the glycol dehydrator to be used as fuel.

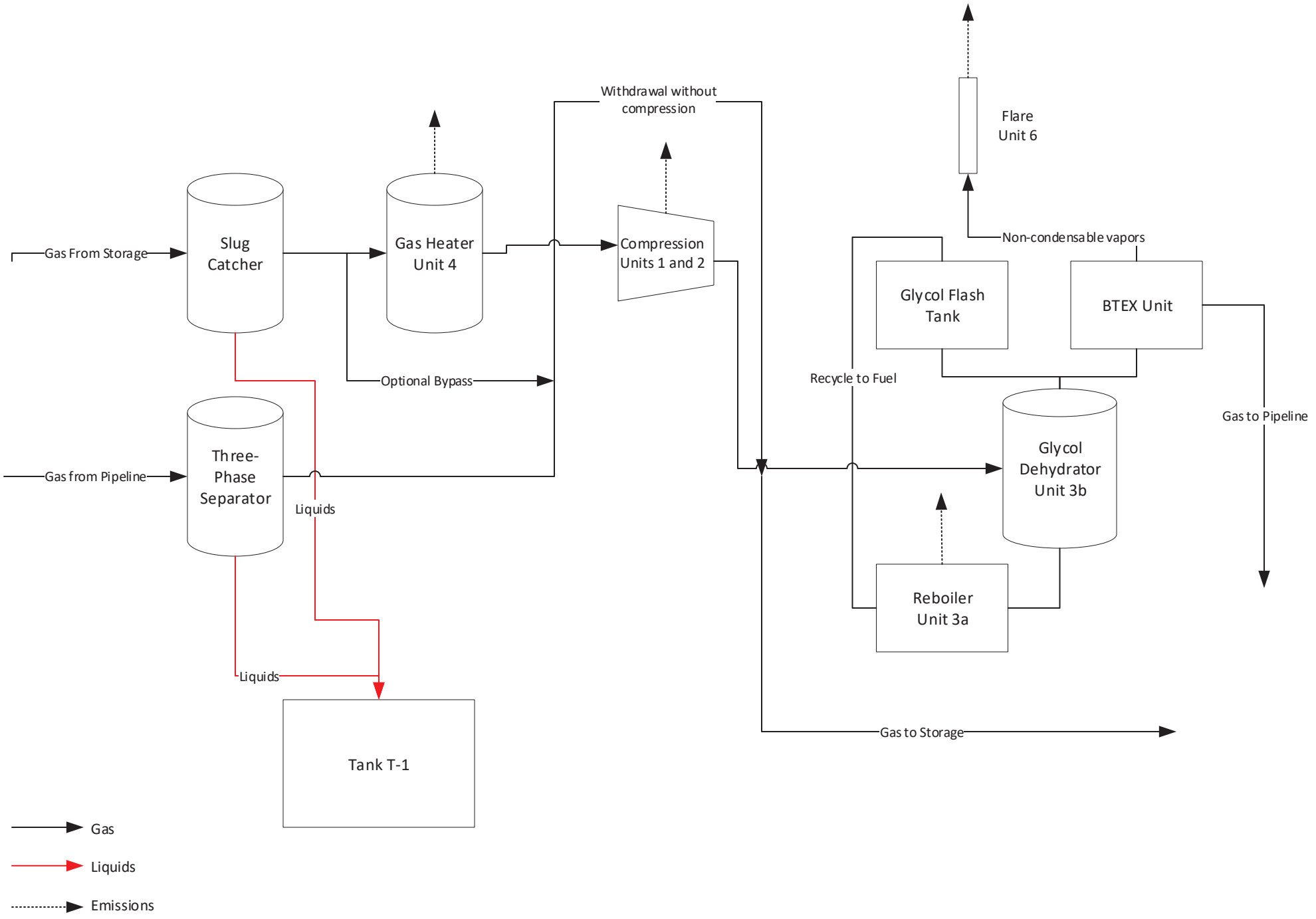
Section 4

Process Flow Sheet

A **process flow sheet** and/or block diagram indicating the individual equipment, all emission points and types of control applied to those points. The unit numbering system should be consistent throughout this application.

A process flow sheet is included in this section.

Washington Ranch Storage Facility



Section 6

All Calculations

Show all calculations used to determine both the hourly and annual controlled and uncontrolled emission rates. All calculations shall be performed keeping a minimum of three significant figures. Document the source of each emission factor used (if an emission rate is carried forward and not revised, then a statement to that effect is required). If identical units are being permitted and will be subject to the same operating conditions, submit calculations for only one unit and a note specifying what other units to which the calculations apply. All formulas and calculations used to calculate emissions must be submitted. The "Calculations" tab in the UA2 has been provided to allow calculations to be linked to the emissions tables. Add additional "Calc" tabs as needed. If the UA2 or other spread sheets are used, all calculation spread sheet(s) shall be submitted electronically in Microsoft Excel compatible format so that formulas and input values can be checked. Format all spread sheets and calculations such that the reviewer can follow the logic and verify the input values. Define all variables. If calculation spread sheets are not used, provide the original formulas with defined variables. Additionally, provide subsequent formulas showing the input values for each variable in the formula. All calculations, including those calculations are imbedded in the Calc tab of the UA2 portion of the application, the printed Calc tab(s), should be submitted under this section.

Tank Flashing Calculations: The information provided to the AQB shall include a discussion of the method used to estimate tank-flashing emissions, relative thresholds (i.e., NOI, permit, or major source (NSPS, PSD or Title V)), accuracy of the model, the input and output from simulation models and software, all calculations, documentation of any assumptions used, descriptions of sampling methods and conditions, copies of any lab sample analysis. If Hysis is used, all relevant input parameters shall be reported, including separator pressure, gas throughput, and all other relevant parameters necessary for flashing calculation.

SSM Calculations: It is the applicant's responsibility to provide an estimate of SSM emissions or to provide justification for not doing so. In this Section, provide emissions calculations for Startup, Shutdown, and Routine Maintenance (SSM) emissions listed in the Section 2 SSM and/or Section 22 GHG Tables and the rational for why the others are reported as zero (or left blank in the SSM/GHG Tables). Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on calculating SSM emissions. If SSM emissions are greater than those reported in the Section 2, Requested Allowables Table, modeling may be required to ensure compliance with the standards whether the application is NSR or Title V. Refer to the Modeling Section of this application for more guidance on modeling requirements.

Glycol Dehydrator Calculations: The information provided to the AQB shall include the manufacturer's maximum design recirculation rate for the glycol pump. If GRI-Glycalc is used, the full input summary report shall be included as well as a copy of the gas analysis that was used.

Road Calculations: Calculate fugitive particulate emissions and enter haul road fugitives in Tables 2-A, 2-D and 2-E for:

1. If you transport raw material, process material and/or product into or out of or within the facility and have PER emissions greater than 0.5 tpy.
2. If you transport raw material, process material and/or product into or out of the facility more frequently than one round trip per day.

Significant Figures:

A. All emissions standards are deemed to have at least two significant figures, but not more than three significant figures.

B. At least 5 significant figures shall be retained in all intermediate calculations.

C. In calculating emissions to determine compliance with an emission standard, the following rounding off procedures shall be used:

(1) If the first digit to be discarded is less than the number 5, the last digit retained shall not be changed;

(2) If the first digit discarded is greater than the number 5, or if it is the number 5 followed by at least one digit other than the number zero, the last figure retained shall be increased by one unit; **and**

(3) If the first digit discarded is exactly the number 5, followed only by zeros, the last digit retained shall be rounded upward if it is an odd number, but no adjustment shall be made if it is an even number.

(4) The final result of the calculation shall be expressed in the units of the standard.

Control Devices: In accordance with 20.2.72.203.A(3) and (8) NMAC, 20.2.70.300.D(5)(b) and (e) NMAC, and 20.2.73.200.B(7) NMAC, the permittee shall report all control devices and list each pollutant controlled by the control device

regardless if the applicant takes credit for the reduction in emissions. The applicant can indicate in this section of the application if they chose to not take credit for the reduction in emission rates. For notices of intent submitted under 20.2.73 NMAC, only uncontrolled emission rates can be considered to determine applicability unless the state or federal Acts require the control. This information is necessary to determine if federally enforceable conditions are necessary for the control device, and/or if the control device produces its own regulated pollutants or increases emission rates of other pollutants.

Emissions affected by the proposed changes are included in this section.

Unit 3a: Glycol Dehydrator Reboiler
Emissions of NO_x, CO, PM, and VOC were based on emissions factors from AP-42 Tables 1.4-1 and 1.4-2. SO2 emissions were based on a maximum allowable total sulfur content of 5.0 grains per 100 scf in pipeline quality natural gas, and an assumed 100% conversion of total sulfur to SO_2. The reboiler is fueled with flash tank off gas vapors from the glycol dehydrator; therefore, H_2S emissions are negligible. Greenhouse gas emissions were estimated using emissions factors from 40 CFR 98 Subpart C, Table C-1 and C-2.

Unit 3b: Glycol Dehydrator
Emissions from the glycol dehydrator were calculated using GRI-GLYCalc. It was assumed that the process flare controls the dehydrator condenser off-gas VOC and HAP emissions by 98%. A 100% safety factor was added to the dehydrator condenser off-gas flow rate. The dehydrator flash tank emissions are routed to the reboiler to be used as fuel.

Unit 6: Process Flare
Emissions of NO_x and CO are based on emission factors from TNRCC RG-109. Emissions of VOCs and HAPs are based on the VOCs and HAPs resulting from the glycol dehydrator condenser off-gas. SO_2 emission were calculated using fuel consumption rates and a fuel gas sulfur content of 5 grains/ 100 scf. It was assumed that 100% of total sulfur is converted to SO_2. Greenhouse gas emissions were estimated using calculation methodology from 40 CFR 98.233 – Calculating GHG emissions.

El Paso Natural Gas Company, LLC - Washington Ranch Storage Facility

Emissions Summary

Uncontrolled Emissions

Unit	NO_x		CO		VOC		SO_x		TSP		PM_{10}		$PM_{2.5}$		HCOH		Acrolein		n-Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1	27.28	119.50	27.28	119.50	19.84	86.91	0.48	2.08	-	-	1.1230	4.9189	1.12	4.92	3.22	14.12	0.22	0.98	0.029	0.13	3.67	16.09
2	27.28	119.50	27.28	119.50	19.84	86.91	0.48	2.08	-	-	1.1230	4.9189	1.12	4.92	3.22	14.12	0.22	0.98	0.029	0.13	3.67	16.09
3a	0.31	1.37	0.26	1.15	0.017	0.075	0.045	0.20	-	-	0.024	0.10	0.024	0.10	1.31E-03	5.75E-03	-	-	1.20E-03	5.25E-03	5.39E-03	0.024
3b[1]	-	-	-	-	19.59	85.80	-	-	-	-	-	-	-	-	-	-	-	-	0.30	1.33	4.29	18.80
4	0.63	2.78	0.53	2.33	0.035	0.15	0.091	0.40	-	-	0.048	0.21	0.048	0.21	6.34E-03	0.028	-	-	0.011	0.046	0.11	0.47
6[2]	0.012	0.050	0.023	0.10	-	-	6.29E-04	2.75E-03	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FUG	-	-	-		*	1.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	0.024
SSM/M1	-	-	-	-	-	10.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**55.52**	**243.19**	**55.38**	**242.57**	**59.33**	**270.96**	**1.09**	**4.76**	**0.00**	**0.00**	**2.32**	**10.15**	**2.32**	**10.15**	**6.46**	**28.28**	**0.45**	**1.96**	**0.37**	**1.64**	**11.75**	**51.49**

Controlled Emissions

Unit	NO_x		CO		VOC		SO_x		TSP		PM_{10}		$PM_{2.5}$		HCOH		Acrolein		n-Hexane		Total HAPs	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
1	27.28	119.50	27.28	119.50	19.84	86.91	0.48	2.08	-	-	1.1230	4.92	1.12	4.92	3.22	14.12	0.22	0.98	0.029	0.13	3.67	16.09
2	27.28	119.50	27.28	119.50	19.84	86.91	0.48	2.08	-	-	1.1230	4.92	1.12	4.92	3.22	14.12	0.22	0.98	0.029	0.13	3.67	16.09
3a	0.31	1.37	0.26	1.15	0.017	0.075	0.045	0.20	-	-	0.024	0.10	0.024	0.10	1.31E-03	5.75E-03	-	-	1.20E-03	5.25E-03	5.39E-03	0.024
3b[1]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4	0.63	2.78	0.53	2.33	0.035	0.15	0.091	0.40	-	-	0.048	0.21	0.048	0.21	6.34E-03	0.028	-	-	0.011	0.046	0.11	0.47
6	0.10	0.44	0.20	0.88	0.22	0.98	6.29E-04	2.75E-03	-	-	-	-	-	-	-	-	-	-	-	-	0.075	0.33
FUG	-	-	-	-	*	1.11	-	-	-	-	-	-	-	-	-	-	-	-	-	-	*	0.024
SSM/M1	-	-	-	-	-	10.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	**55.61**	**243.58**	**55.56**	**243.36**	**39.96**	**186.13**	**1.09**	**4.76**	**0.00**	**0.00**	**2.32**	**10.15**	**2.32**	**10.15**	**6.46**	**28.28**	**0.45**	**1.96**	**0.07**	**0.31**	**7.53**	**33.02**

Notes

"*" Denotes an hourly emission limit is not appropriate for this source

"-" Denotes emissions of this pollutant are negligible or not expected

Dehydrator condensor still vent vapors are routed to the process flare (Unit 6) for destruction; emissions are represented at that unit. Dehydrator flash tank emissions are routed to the reboiler to be used as fuel. In a controlled

[1] scenario, there are no emissions from unit 3b.

[2] As a conservative measure, uncontrolled flare emissions are represented as pilot-only emissions. Unit 6 routinely flares dehydrator condenser off-gas and does not operate with pilot only.

El Paso Natural Gas Company, LLC - Washington Ranch Storage Facility

Dehydrator Reboiler Emissions

Emission Unit: 3a
Source Description: Dehydrator reboiler

Fuel Consumption

Input heat rate	3	MMBtu/hr	As permitted (based on engineering estimate)
Fuel heat value	959.95	Btu/scf	
Fuel usage	3.13	Mscf/hr	Heat Input Rate MMBtu/hr *scf/947 Btu*1000 Mbtu/MMBtu
Fuel usage	27.4	MMscf/yr	Fuel usage Mscf/hr*8760 hrs/yr*MMscf/1000 Mscf

Emission Rates

NO_x	CO	VOC	SO_2[(1)]	PM		
100	84	5.5		7.6	lb/MMscf	AP-42 Tables 1.4-1 and 1.4-2
			0.050		gr S/scf	Pipeline specification
0.31	**0.26**	**0.017**	**0.045**	**0.024**	**lb/hr**	
1.4	**1.1**	**0.075**	**0.20**	**0.10**	**tpy**	(lb/hr)*(8760 hrs/yr)*(ton/2000 lb)

Total HAPS[(2)]	HCOH[(2)]	Acrolein[(2)]	n-Hexane[(2)]	
25%	25%	25%	25%	Safety factor
0.0054	**0.0013**	**-**	**0.0012**	
0.024	**0.0058**	**-**	**0.0053**	(lb/hr)*(8760 hrs/yr)*(ton/2000 lb)

GHG Emission Calculations

CO_2	N_2O	CH_4		
53.06	1.00E-04	1.00E-03	kg/MMBtu	40 CFR 98, Subpart C, Tables C-1 and C-2
1394417	3	26	kg / yr	
1536.6	0.0029	0.029	tons / yr	
1.00	298.00	25.00	GWP	
1536.6	0.86	0.72	tons/yr CO_2e	

Notes

(1) (2 gr S/100scf)*(lb/7000 gr)*(1000*Fuel usage scf/hr)*(64 lb SO_2/32 lb S)

(2) HAP emissions calculated using GRI-HAPCalc with a 25% safety factor added

Site Elevation	3710	ft MSL			
Standard Pressure	29.92	in Hg			
Pressure at Elevation	26.12	in Hg	Hess, Introduction to Theoretical Meteorology, eqn. 6.8		
Standard Temperature	528	R			

Exhaust Parameters

Reboiler Stack (3a)

Exhaust temp	600	°F	Engineering estimate		
Stack height	30	ft	As permitted (based on engineering estimate)		
Stack diameter	1.0	ft	As permitted (based on engineering estimate)		
40 CFR 60 Appendix A Method 19	10610	wscf/MMBtu			
Exhaust flow (Vs)	530.5	scfm	Heat input*F factor/60	8.8	scf/sec
Exhaust flow (Va)	1219.6	acfm	Va = Vs*(Ps/Pa)*(Ta/Ts)	20.3	acf/sec
Exhaust velocity	25.9	ft/sec	Exhaust flow acfm /(Pi * (stack diameter/2)^2) * min/60 s		

Glycol Dehydrator

Unit: 3b
Description: Glycol Dehydrator
Control Equipment: BTEX Condenser and Flare
Dry Gas Flow Rate: 250 MMscfd

Pump Circulation Rate: 12.5 gpm

Uncontrolled Emissions[1]

Unit	VOC		H_2S		Methane		CO_2		Total HAP		n-Hexane		Benzene		Toluene		Ethylbenzene		Xylenes	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Flash Tank	2.93	12.82	0.00E+00	0.00E+00	21.66	94.86	3.45	15.11	0.092	0.40	0.062	0.27	0.010	0.042	0.015	0.066	0.00070	0.0031	0.0040	0.018
Regenerator	16.66	72.98	0.00E+00	0.00E+00	3.74	16.38	5.28	23.13	4.20	18.40	0.24	1.06	0.83	3.65	1.81	7.94	0.14	0.62	1.17	5.13

Controlled Emissions[2]

Unit	VOC		H_2S		Methane		CO_2		Total HAP		n-Hexane		Benzene		Toluene		Ethylbenzene		Xylenes	
	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
Flash Tank	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Regenerator	Regenerator Overheads are controlled by the BTEX condenser and the flare (Unit 6). Emissions are represented at that unit.																			

Notes
[1] Emissions are calculated using GRI-GLYCalc uncontrolled regenerator emissions and flash tank off-gas streams.
[2] Flash tank off-gas emissions are routed to the reboiler to be used as fuel with a 100% capture efficiency. Regenerator emissions are controlled by a BTEX condenser and flare (Unit 6).

Process Flare

Emission Unit: 6
Source Description: Uncondensable Regenerator Overheads

VOC Heat Input and Flow Rate Calculation Per Unit

Parameters	Value	Unit	Notes
Number of process flares	1	-	
VOC Emissions	48.86	tpy	Uncondensable Regenerator Overheads
HAP Emissions	16.51	tpy	Uncondensable Regenerator Overheads
Total Flared Gas Heating Value	820.56	Btu/scf	Weighted average heating value from all streams
Total Flared Gas Flow	395.00	scf/hr	Total flow from all streams to flare
Total Flared Gas Heating Rate	0.32	MMBtu/hr	Calculated based on heating value and steady-state flow
Flared Gas Flow Rate with Safety Factor	100%	%	Safety factor
	790.00	scf/hr	Flow with safety factor
	6.92	MMscf/yr	
Short-Term Safety Factor	0%	-	Applied to emissions to account for variations in heat content.
Heating Rate	0.65	MMBtu/hr	
Flare pilot	44	scf/hr	Engineering Estimate
	100%		Safety factor
	88	scf/hr	Pilot flow with safety factor
	8.80E-05	MMscf/hr	
Pipeline Gas HHV	947	Btu/scf	Facility specification
Flare Heat Input	0.083	MMBtu/hr	
	0.77	MMscf/yr	
Heating Rate + Pilot	0.73	MMBtu/hr	

Emission Rates Per Unit								
	NO_X	CO	VOC[1]	SO_2[2]	H_2S	HAPs[1]	Units	Notes
Emission Factors	0.1380	0.2755					lb/MMBtu	TNRCC RG-109 (high Btu; other)
							lb H_2S/Mscf	
				3.14E-04			lb S/hr	
			48.86		-	16.51	tpy	Uncondensable Regenerator Overheads
Pilot Emissions	0.012	0.023	-	6.29E-04		-	lb/hr	
	0.050	0.10	-	0.0028		-	tpy	
Process Emissions	0.089	0.18	-	-	-	-	lb/hr	
			0.223	-	-	0.075	lb/hr	
	0.39	0.78	0.98	-	-	0.330	tpy	
Total Emissions	***0.10***	***0.20***	***0.22***	***0.00063***	***-***	***0.075***	lb/hr	
	0.44	***0.88***	***0.98***	***0.0028***	***-***	***0.33***	tpy	

[1] The flare controls the uncondensed regenerator overheads from the condenser stream. 98% DRE

[2] Fuel sulfur content is assumed to be 5 gr/100 Scf

"-" Indicates emissions of this pollutant are not expected.

Flare GHG Emissions - Combustion Stream

§98.233(n) Flare stack GHG emissions.

Step 1. Calculate contribution of un-combusted CH_4 emissions from the regenerator combustion gas vent (actual conditions).

$E_{a,CH4}$ (un-combusted) = V_a * (1- η)* X_{CH4} *(Equation W-39B)*

where:

$E_{a,CH4}$ = contribution of annual un-combusted CH_4 emissions from regenerator in cubic feet under actual conditions.

V_a = volume of gas sent to combustion unit during the year (cf)

η = Fraction of gas combusted by a burning flare (or regenerator), default value from Subpart W = 0.98

For gas sent to an unlit flare, η is zero.

X_{CH4} = Mole fraction of CH_4 in gas to the flare = 0.2232 (Client gas analysis)

Step 2. Calculate contribution of un-combusted CO_2 emissions from the regenerator combustion gas vent (actual conditions).

$E_{a,CO2}$ = V_a * X_{CO2} *(Equation W-20)*

where:

$E_{a,CO2}$ = contribution of annual un-combusted CO_2 emissions from regenerator in cubic feet under actual conditions.

V_a = volume of gas sent to combustion unit during the year (cf)

X_{CO2} = Mole fraction of CO_2 in gas to the flare = 0.115

Step 3. Calculate contribution of combusted CO_2 emissions from the regenerator combustion gas vent (actual conditions).

$E_{a,CO2}$ (combusted) = Σ (η * V_a * Y_j * R_j) *(Equation W-21)*

where:

η = Fraction of gas combusted by a burning flare (or regenerator) = 0.98

For gas sent to an unlit flare, η is zero.

V_a = volume of gas sent to combustion unit during the year (cf)

Y_j = mole fraction of gas hydrocarbon constituents j:

Constituent j, Methane =	0.223	(Client gas analysis)
Constituent j, Ethane =	0.053	
Constituent j, Propane =	0.023	
Constituent j, Butane =	0.019	
Constituent j, Pentanes Plus =	0.090	

R_j = number of carbon atoms in the gas hydrocarbon constituent j:

Constituent j, Methane =	1
Constituent j, Ethane =	2
Constituent j, Propane =	3
Constituent j, Butane =	4
Constituent j, Pentanes Plus =	5

Step 4. Calculate GHG volumetric emissions at standard conditions (scf).

$$E_{s,n} = \frac{E_{a,n} * (459.67 + T_s) * P_a}{(459.67 + T_a) * P_s}$$ *(Equation W-33)*

where:

$E_{s,n}$ = GHG i volumetric emissions at standard temperature and pressure (STP) in cubic feet

$E_{a,n}$ = GHG i volumetric emissions at actual conditions (cf)

T_s = Temperature at standard conditions (F) =	60	F	
T_a = Temperature at actual conditions (F) =	76	F	(Based on Annual Avg Max Temperature for Hobbs, NM from Western Regional Climate Center)
P_s = Absolute pressure at standard conditions (psia) =	14.7	psia	
P_a = Absolute pressure at actual conditions (psia) =	12.83	psia	

Constant = 459.67 (temperature conversion from F to R)

Step 5. Calculate annual CH_4 and CO_2 mass emissions (ton).

$Mass_{s,i}$ = $E_{s,i}$ * ρ_i * 0.0011023 *(Equation W-36)*

where:

$Mass_{s,i}$ = GHG i (CO_2, CH_4, or N_2O) mass emissions at standard conditions in tons (tpy)

$E_{s,i}$ = GHG i (CO_2, CH_4, or N_2O) volumetric emissions at standard conditions (cf)

ρ_i = Density of GHG i. Use:

CH_4:	0.0192	kg/ft^3 (at 60F and 14.7 psia)
CO_2:	0.0526	kg/ft^3 (at 60F and 14.7 psia)

Step 6. Calculate annual N_2O emissions from portable or stationary fuel combustion sources under actual conditions (cf) using Equation W-40 .

$Mass_{N2O}$ = 0.0011023 * Fuel * HHV * EF *(Equation W-40)*

where:

$Mass_{N2O}$ = annual N_2O emissions from combustion of a particular type of fuel (tons).

Fuel = mass or volume of the fuel combusted

HHV = high heat value of the fuel

Field gas HHV =	1.235E-03	MMBtu/scf	(Default provided in Subpart W Final Amendment;)
EF =	1.00E-04	kg N_2O/MMBtu	

10^{-3} = conversion factor from kg to metric tons.

Step 7. Calculate total annual emission from flare (regenerator) by summing Equations W-40, W-19, W-20, and W-21.

Gas Sent to Flare (cf/yr)	CH_4 Un-Combusted, $E_{a,CH4}$ (cf)	CO_2 Un-Combusted, $E_{a,CO2}$ (cf)	CO_2 Combusted, $E_{a,CO2}$ (cf)	CH_4 Un-Combusted, $E_{a,CH4}$ (scf)	CO_2 Un-Combusted, $E_{a,CO2}$ (scf)	CO_2 Combusted, $E_{a,CO2}$ (scf)	CH_4 Un-Combusted, $E_{a,CH4}$ (tonne/yr)	CO_2 Un-Combusted, $E_{a,CO2}$ (tonne/yr)	CO_2 Combusted, $E_{a,CO2}$ (tonne/yr)	N_2O Mass Emissions (tonne/yr)	CO2e Mass Emissions (tonne/yr)
6,920,400	30,896	793,479	6,290,069	26,145	671,478	5,322,944	0.50	35.32	279.99	0.00085	328.1

Flare GHG Emissions - Pilot

§98.233(n) Flare stack GHG emissions.

Step 1. Calculate contribution of un-combusted CH_4 emissions from the regenerator combustion gas vent (actual conditions).

$E_{a,CH4}$ (un-combusted) = V_a * (1- η)* X_{CH4} *(Equation W-39B)*

where:

$E_{a,CH4}$ = contribution of annual un-combusted CH_4 emissions from regenerator in cubic feet under actual conditions.

V_a = volume of gas sent to combustion unit during the year (cf)

η = Fraction of gas combusted by a burning flare (or regenerator), default value from Subpart W = 0.98

For gas sent to an unlit flare, η is zero.

X_{CH4} = Mole fraction of CH_4 in gas to the flare = 0.9468 (Client gas analysis)

Step 2. Calculate contribution of un-combusted CO_2 emissions from the regenerator combustion gas vent (actual conditions).

$E_{a,CO2}$ = V_a * X_{CO2} *(Equation W-20)*

where:

$E_{a,CO2}$ = contribution of annual un-combusted CO_2 emissions from regenerator in cubic feet under actual conditions.

V_a = volume of gas sent to combustion unit during the year (cf)

X_{CO2} = Mole fraction of CO_2 in gas to the flare = 0.007

Step 3. Calculate contribution of combusted CO_2 emissions from the regenerator combustion gas vent (actual conditions).

$E_{a,CO2}$ (combusted) = $\sum$ (η * V_a * Y_j * R_j) *(Equation W-21)*

where:

η = Fraction of gas combusted by a burning flare (or regenerator) = 0.98

For gas sent to an unlit flare, η is zero.

V_a = volume of gas sent to combustion unit during the year (cf)

Y_j = mole fraction of gas hydrocarbon constituents j:

Constituent j, Methane =	0.947	(Client gas analysis)
Constituent j, Ethane =	0.025	
Constituent j, Propane =	0.004	
Constituent j, Butane =	0.001	
Constituent j, Pentanes Plus =	0.001	

R_j = number of carbon atoms in the gas hydrocarbon constituent j:

Constituent j, Methane =	1
Constituent j, Ethane =	2
Constituent j, Propane =	3
Constituent j, Butane =	4
Constituent j, Pentanes Plus =	5

Step 4. Calculate GHG volumetric emissions at standard conditions (scf).

$$E_{s,n} = \frac{E_{a,n} * (459.67 + T_s) * P_a}{(459.67 + T_a) * P_s} \quad \textit{(Equation W-33)}$$

where:

$E_{s,n}$ = GHG i volumetric emissions at standard temperature and pressure (STP) in cubic feet

$E_{a,n}$ = GHG i volumetric emissions at actual conditions (cf)

T_s = Temperature at standard conditions (F) =	60	F	
T_a = Temperature at actual conditions (F) =	76	F	(Based on Annual Avg Max Temperature for Hobbs, NM from Western Regional Climate Center)
P_s = Absolute pressure at standard conditions (psia) =	14.7	psia	
P_a = Absolute pressure at actual conditions (psia) =	12.83	psia	

Constant = 459.67 (temperature conversion from F to R)

Step 5. Calculate annual CH_4 and CO_2 mass emissions (ton).

$Mass_{s,i}$ = $E_{s,i}$ * ρ_i * 0.0011023 *(Equation W-36)*

where:

$Mass_{s,i}$ = GHG i (CO_2, CH_4, or N_2O) mass emissions at standard conditions in tons (tpy)

$E_{s,i}$ = GHG i (CO_2, CH_4, or N_2O) volumetric emissions at standard conditions (cf)

ρ_i = Density of GHG i. Use:

CH_4:	0.0192	kg/ft^3 (at 60F and 14.7 psia)
CO_2:	0.0526	kg/ft^3 (at 60F and 14.7 psia)

Step 6. Calculate annual N_2O emissions from portable or stationary fuel combustion sources under actual conditions (cf) using Equation W-40 .

$Mass_{N2O}$ = 0.0011023 * Fuel * HHV * EF *(Equation W-40)*

where:

$Mass_{N2O}$ = annual N_2O emissions from combustion of a particular type of fuel (tons).

Fuel = mass or volume of the fuel combusted

HHV = high heat value of the fuel

Field gas HHV =	1.235E-03	MMBtu/scf (Default provided in Subpart W Final Amendment;)
EF =	1.00E-04	kg N_2O/MMBtu

10^{-3} = conversion factor from kg to metric tons.

Step 7. Calculate total annual emission from flare (regenerator) by summing Equations W-40, W-19, W-20, and W-21.

Gas Sent to Flare (cf/yr)	CH_4 Un-Combusted, $E_{a,CH4}$ (cf)	CO_2 Un-Combusted, $E_{a,CO2}$ (cf)	CO_2 Combusted, $E_{a,CO2}$ (cf)	CH_4 Un-Combusted, $E_{a,CH4}$ (scf)	CO_2 Un-Combusted, $E_{a,CO2}$ (scf)	CO_2 Combusted, $E_{a,CO2}$ (scf)	CH_4 Un-Combusted, $E_{a,CH4}$ (tonne/yr)	CO_2 Un-Combusted, $E_{a,CO2}$ (tonne/yr)	CO_2 Combusted, $E_{a,CO2}$ (tonne/yr)	N_2O Mass Emissions (tonne/yr)	CO2e Mass Emissions (tonne/yr)
770,880	14,597	5,126	771,388	12,353	4,338	652,783	0.24	0.23	34.34	0.00010	40.5

Section 6.a

Green House Gas Emissions

(Submitting under 20.2.70, 20.2.72 20.2.74 NMAC)

Title V (20.2.70 NMAC), Minor NSR (20.2.72 NMAC), and PSD (20.2.74 NMAC) applicants must estimate and report greenhouse gas (GHG) emissions to verify the emission rates reported in the public notice, determine applicability to 40 CFR 60 Subparts, and to evaluate Prevention of Significant Deterioration (PSD) applicability. GHG emissions that are subject to air permit regulations consist of the sum of an aggregate group of these six greenhouse gases: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

Calculating GHG Emissions:

1. Calculate the ton per year (tpy) GHG mass emissions and GHG CO_2e emissions from your facility.
2. GHG mass emissions are the sum of the total annual tons of greenhouse gases without adjusting with the global warming potentials (GWPs). GHG CO_2e emissions are the sum of the mass emissions of each individual GHG multiplied by its GWP found in Table A-1 in 40 CFR 98 Mandatory Greenhouse Gas Reporting.
3. Emissions from routine or predictable start up, shut down, and maintenance must be included.
4. Report GHG mass and GHG CO_2e emissions in Table 2-P of this application. Emissions are reported in **short** tons per year and represent each emission unit's Potential to Emit (PTE).
5. All Title V major sources, PSD major sources, and all power plants, whether major or not, must calculate and report GHG mass and CO2e emissions for each unit in Table 2-P.
6. For minor source facilities that are not power plants, are not Title V, and are not PSD there are three options for reporting GHGs in Table 2-P: 1) report GHGs for each individual piece of equipment; 2) report all GHGs from a group of unit types, for example report all combustion source GHGs as a single unit and all venting GHGs as a second separate unit; 3) or check the following □ By checking this box, the applicant acknowledges the total CO2e emissions are less than 75,000 tons per year.

Sources for Calculating GHG Emissions:

- Manufacturer's Data
- AP-42 Compilation of Air Pollutant Emission Factors at http://www.epa.gov/ttn/chief/ap42/index.html
- EPA's Internet emission factor database WebFIRE at http://cfpub.epa.gov/webfire/
- 40 CFR 98 Mandatory Green House Gas Reporting except that tons should be reported in short tons rather than in metric tons for the purpose of PSD applicability.
- API Compendium of Greenhouse Gas Emissions Methodologies for the Oil and Natural Gas Industry. August 2009 or most recent version.
- Sources listed on EPA's NSR Resources for Estimating GHG Emissions at http://www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases:

Global Warming Potentials (GWP):
Applicants must use the Global Warming Potentials codified in Table A-1 of the most recent version of 40 CFR 98 Mandatory Greenhouse Gas Reporting. The GWP for a particular GHG is the ratio of heat trapped by one unit mass of the GHG to that of one unit mass of CO_2 over a specified time period.

"Greenhouse gas" for the purpose of air permit regulations is defined as the aggregate group of the following six gases: carbon dioxide, nitrous oxide, methane, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. **(20.2.70.7 NMAC, 20.2.74.7 NMAC).** You may also find GHGs defined in 40 CFR 86.1818-12(a).

Metric to Short Ton Conversion:
Short tons for GHGs and other regulated pollutants are the standard unit of measure for PSD and title V permitting programs. 40 CFR 98 Mandatory Greenhouse Reporting requires metric tons.
1 metric ton = 1.10231 short tons (per Table A-2 to Subpart A of Part 98 – Units of Measure Conversions)

Section 7

Information Used To Determine Emissions

Information Used to Determine Emissions shall include the following:

- ☐ If manufacturer data are used, include specifications for emissions units and control equipment, including control efficiencies specifications and sufficient engineering data for verification of control equipment operation, including design drawings, test reports, and design parameters that affect normal operation.
- ☐ If test data are used, include a copy of the complete test report. If the test data are for an emissions unit other than the one being permitted, the emission units must be identical. Test data may not be used if any difference in operating conditions of the unit being permitted and the unit represented in the test report significantly effect emission rates.
- ☐ If the most current copy of AP-42 is used, reference the section and date located at the bottom of the page. Include a copy of the page containing the emissions factors, and clearly mark the factors used in the calculations.
- ☐ If an older version of AP-42 is used, include a complete copy of the section.
- ☐ If an EPA document or other material is referenced, include a complete copy.
- ☐ Fuel specifications sheet.
- ☐ If computer models are used to estimate emissions, include an input summary (if available) and a detailed report, and a disk containing the input file(s) used to run the model. For tank-flashing emissions, include a discussion of the method used to estimate tank-flashing emissions, relative thresholds (i.e., permit or major source (NSPS, PSD or Title V)), accuracy of the model, the input and output from simulation models and software, all calculations, documentation of any assumptions used, descriptions of sampling methods and conditions, copies of any lab sample analysis.

Unit 3a-Glycol Dehydrator Reboiler

- AP-42 Tables 1.4-1 and 1.4-2
- GRI-HAPCalc Output
- 40 CFR 98 Subpart C Tables C-1 and C-2

Unit 3b – Glycol Dehydrator

- GRI -GLYCalc Output
- Extended contactor inlet gas analysis, dated 10/5/2006

Unit 6 – Process Flare

- GRI -GLYCalc Output
- TNRCC RG-109
- 40 CFR 98.233 – Calculating GHG Emissions

LABORATORY SERVICE REPORT

REQUESTOR: Ginest, Chad O.
Carlsbad, NM

REPORT DATE: 10/5/2006
REQUEST NO: 2006060776
APPROVED BY: Campbell, Darrell

DISTRIBUTION: Barta, George; Charlet, Larry; Thompson, Glenn; Whitney, Mark; Ryan, Bill

PERFORMED BY: EP-Hockly Gas Lab

Request Description: Washington Ranch Dehy Contactor Inlet and Outlet
Date Received: 6/14/2006
Date Completed: 10/5/2006

Sample No: 1 Sampled By: Lorenzo Hernandez Sample Date: 6/14/2005 10:30:00 AM

Description:
Analysis: WP Gas Analysis, Extended SPL
Purpose: Disposal/Environmental Concerns
Matrix: Gas
Location: EPNG - Midland - Carlsbad - 6595 - 0+0 - Washington Ranch CS - Contactor Inlet

Field Data:

Field Comments: H2S = <0.25 ppm
RSH = 0.5 ppm
H20 = 4 lbs/MMSCF
Glycol circulation Rate 10.5 GPM
Lean Glycol Temperature = 360F Rich Glycol Temperature = Approx 110F
Gas Flow Rate = 51 mmscf/d

Sample No: 2 Sampled By: Lorenzo Hernandez Sample Date: 6/14/2005 10:35:00 AM

Description:
Analysis: WP Gas Analysis, Extended SPL
Purpose: Disposal/Environmental Concerns
Matrix: Gas
Location: EPNG - Midland - Carlsbad - 6595 - 0+0 - Washington Ranch CS - Contactor Outlet

Field Data:

Field Comments: H2S = <0.25 ppm
RSH = 0.5 ppm
H20 = 2 lbs/MMSCF

Data: See attached sheet(s).

Comments:

Request: 2006060776

Sample:	**1**	**2**
Extended Gas Analysis		
Nitrogen (Mol %)	1.489	1.468
Methane (Mol %)	94.665	94.678
Carbon Dioxide (Mol %)	0.674	0.665
Ethane (Mol %)	2.537	2.538
Propane (Mol %)	0.399	0.399
Isobutane (Mol %)	0.055	0.056
n-Butane (Mol %)	0.082	0.082
Isopentane (Mol %)	0.026	0.028
n-Pentane (Mol %)	0.020	0.023
i-Hexane (Mol %)	0.012	0.013
n-Hexane (Mol %)	0.011	0.008
Benzene (Mol %)	0.001	0.002
Cyclohexane (Mol %)	0.005	0.005
i-Heptanes (Mol %)	0.008	0.009
n-Heptane (Mol %)	0.004	0.004
Toluene (Mol %)	0.002	0.003
i-Octanes (Mol %)	0.008	0.013
n-Octane (Mol %)	0.002	0.003
Ethylbenzene (Mol %)	< 0.001	< 0.001
m,o,&p-Xylene (Mol %)	< 0.001	< 0.001
i-Nonanes (Mol %)	< 0.001	0.002
n-Nonane (Mol %)	< 0.001	0.001
i-Decanes (Mol %)	< 0.001	< 0.001
n-Decane (Mol %)	< 0.001	< 0.001
Undecanes (Mol %)	< 0.001	< 0.001
Dodecanes (Mol %)	< 0.001	< 0.001
Tridecanes (Mol %)	< 0.001	< 0.001
Tetradecanes Plus (Mol %)	< 0.001	< 0.001
Gallons per Thousand Cubic Feet		
Nitrogen (GPM)	0.163	0.161
Methane (GPM)	15.995	15.997
Carbon Dioxide (GPM)	0.114	0.112
Ethane (GPM)	0.676	0.677
Propane (GPM)	0.109	0.109
Isobutane (GPM)	0.018	0.018
n-Butane (GPM)	0.026	0.026
Isopentane (GPM)	0.009	0.010
n-Pentane (GPM)	0.007	0.008
i-Hexane (GPM)	0.005	0.005
n-Hexane (GPM)	0.003	0.003
Benzene (GPM)	< 0.001	< 0.001
Cyclohexane (GPM)	0.002	0.002
i-Heptanes (GPM)	0.003	0.004
n-Heptane (GPM)	0.002	0.002
Toluene (GPM)	0.001	0.001
i-Octanes (GPM)	0.005	0.006
n-Octane (GPM)	0.001	0.001
Ethylbenzene (GPM)	< 0.001	< 0.001

Request: 2006060776

Sample:	**1**	**2**
m,o,&p-Xylene (GPM)	< 0.001	< 0.001
i-Nonanes (GPM)	< 0.001	0.001
n-Nonane (GPM)	< 0.001	0.001
i-Decanes (GPM)	< 0.001	< 0.001
n-Decane (GPM)	< 0.001	< 0.001
Undecanes (GPM)	< 0.001	< 0.001
Dodecanes (GPM)	< 0.001	< 0.001
Tridecanes (GPM)	< 0.001	< 0.001
Tetradecanes Plus (GPM)	< 0.001	< 0.001
Natural Gas Mixture Properties, Calculated		
Real Gas Specific Gravity	0.5879	0.5881
Real Gross Heating Value (BTU/SCF60F)	1024.4	1025.4

October 2000
RG-109 (Draft)

Air Permit Technical Guidance for Chemical Sources:

Flares and Vapor Oxidizers

printed on recycled paper

Air Permits Division

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Published and distributed by:
Texas Natural Resource Conservation Commission
P.O. Box 13087
Austin, Texas 78711-3087

Technical Disclaimer

This document is intended as guidance to explain the specific requirements for new source review permitting of flares and vapor oxidizers; it does not supersede or replace any state or federal law, regulation, or rule. References to abatement equipment technologies are not intended to represent minimum or maximum levels of Best Available Control Technology (BACT). Determinations of BACT are made on a case-by-case basis as part of the New Source Review of permit applications. BACT determinations are always subject to adjustment in consideration of specific process requirements, air quality concerns, and recent developments in abatement technology. Additionally, specific health effects concerns may indicate stricter abatement than required by the BACT determination.

The represented calculation methods are intended as an aid in the completion of acceptable submittals; alternate calculation methods may be equally acceptable if they are based upon, and adequately demonstrate, sound engineering assumptions or data.

These guidelines are applicable as of this document's publication date but are subject to revision during the permit application preparation and review period. It is the responsibility of the applicants to remain abreast of any guideline or regulation developments that may affect their industries.

The electronic version of this document may not contain attachments or forms (such as the PI-1, Standard Exemptions, or tables) that can be obtained electronically elsewhere on the TNRCC Web site.

The special conditions included with these guidelines are for purposes of example only. Special conditions included in an actual permit are written by the reviewing engineer to address specific permit requirements and operating conditions.

TABLE OF CONTENTS

Tables

This document provides guidance for two classes of vapor combustion control devices: flares and vapor oxidizers. While there may be some overlap between the two, flares have generally been treated separately by the EPA and the TNRCC, in large part because flares have an open flame and often cannot be sampled, so emissions are estimated based on the results of flare testing performed in the early 1980s. Each of the two classes will be dealt with separately in each of the chapters of this document.

Combustion Control Devices NOT Discussed. This document will not cover permitting of RCRA or BIF units because the requirements for these units often go beyond the requirements for state air permitting. Incinerators used to treat solid wastes are covered in another technical guidance document, *Incinerators*. Guidance for combustion control devices associated with spray paint booths, coatings operations, and semiconductor facilities should be obtained by calling the TNRCC New Source Review Permits Division at (512) 239-1250.

Flares

Flare systems generally are open-flame control devices used for disposing of waste gas streams during both routine process and emergency or upset conditions. In addition to simple, unassisted flares, typical smokeless flare systems include, but are not limited to, the following:

- ***Enclosed Flares/Vapor Combustors.*** Enclosed flares are used in disposing of waste gas streams in instances where a visible flame is unacceptable. Applications include chemical processing, petroleum refining and production, and municipal waste gas treatment. These may be referred to as vapor combustors and can have more than one burner in the stack.

- ***Steam-Assisted Flares***. Steam-assisted flares are used in disposing of low-pressure waste gas streams when steam is available and practical to minimize smoking from the flare. Applications are similar to those of enclosed flares. Flares might also be assisted with natural gas if readily available on site; these flares would undergo a case-by-case review.

- ***Air-Assisted Flares.*** Air-assisted flares are used in disposing of low-pressure waste gas streams when practical or when steam utilities are not available to minimize smoking from the flare. Applications include chemical processing, petroleum refining and production, and pipeline transportation.

- ***Sonic Flares.*** Sonic flares are used in disposing of high-pressure waste gas streams. Applications include gas production, pipeline transportation, and treatment plants.

- ***Multipoint Flare Systems.*** Multipoint flare systems are used in disposing of both high- and low-pressure waste gas streams. Multiple burner tips in conjunction with a staged control system provide for controlled combustion. Applications are similar to those of air-assisted flares.

Vapor Oxidizers

These devices generally do not have an open flame but have an exhaust stack which allows for sampling and monitoring of exhaust emissions. The most common type, thermal, relies on the combustion heat of the waste gas and assist fuel (if required) to oxidize the waste gas air contaminants. Other types include:

- ***Recuperative.*** In this case, the waste gas is directed to a heat exchanger to be preheated by the exhaust gas, to minimize the need for additional assist fuel. Recuperative oxidizers are considered a subset of thermal oxidizers in this document.

- ***Regenerative***. Combustion takes place in a chamber with a heat sink, such as ceramic saddles, which retains the heat of combustion, allowing for combustion of more dilute vapor streams (which have a low heat of combustion) at a lower cost. These units generally have multiple chambers, which allow for the preheat of one chamber by exhaust gases while combustion takes place in another chamber.

- ***Catalytic.*** Combustion takes place over a catalyst that allows for combustion at a lower temperature (in the range of 600 to 800°F as opposed to greater than 1400°F for many thermal oxidizers). Catalytic oxidizers function best with a waste stream with constant flow and composition.

This chapter provides detailed instructions for the calculations necessary to verify BACT and estimate emissions from flares and vapor oxidizers. Flares must be checked to determine whether they will satisfy the flow and thermal requirements of 40 CFR § 60.18, and their emissions are determined by the use of emission factors. Example calculations are provided for these flare calculations.

Oxidizer emissions are determined by using previous sampling results or emission factors from the manufacturer or AP-42. These calculations are very similar to the flare calculations and are only discussed in general terms.

Flares: Introduction

Although emissions from emergency flares are not included in a permit when it is issued, emissions should be estimated for both routine process flares and emergency flares. Sometimes, emissions of routine pilot gas combustion may be included in an issued permit for emergency flares (although not required).

In this section, the *flare* emission factors and destruction efficiencies are presented first. This information is followed by sample *calculations* that demonstrate how to ensure that the requirements of 40 CFR § 60.18 are satisfied and how to estimate emissions from a flare. Flare data in Attachment B (typical refinery flare) will be used as a basis in most of the following calculations. Flare data in Attachment C (acid gas flare) will be used as a basis in the example calculations for SO_2 emissions.

Flare Emission Factors

The usual flare destruction efficiencies and emission factors are provided in Table 4. The high-Btu waste streams referred to in the table have a heating value greater than 1,000 Btu/scf.

Flare Destruction Efficiencies

Claims for destruction efficiencies greater than those listed in Table 4 will be considered on a case-by-case basis. The applicant may make one of the three following demonstrations to justify the higher destruction efficiency: (1) general method, (2) 99.5 percent justification, or (3) flare stack sampling.

Table 4. Flare Factors

Waste Stream	Destruction/Removal Efficiency (DRE)		
VOC	98 percent (generic) 99 percent for compounds containing no more than 3 carbons that contain no elements other than carbon and hydrogen in addition to the following compounds: methanol, ethanol, propanol, ethylene oxide and propylene oxide		
H_2S	98 percent		
NH_3	case by case		
CO	case by case		
Air Contaminants	**Emission Factors**		
thermal NO_x	steam-assist:	high Btu	0.0485 lb/MMBtu
		low Btu	0.068 lb/MMBtu
	other:	high Btu	0.138 lb/MMBtu
		low Btu	0.0641 lb/MMBtu
fuel NO_x	NO_x is 0.5 wt percent of inlet NH_3, other fuels case by case		
CO	steam-assist:	high Btu	0.3503 lb/MMBtu
		low Btu	0.3465 lb/MMBtu
	other:	high Btu	0.2755 lb/MMBtu
		low Btu	0.5496 lb/MMBtu
PM	none, required to be smokeless		
SO_2	100 percent S in fuel to SO_2		

*The only exeption ot this is if inorganics might be emitted from the flare. In the case of landfills, the AP-42 PM factor may be used. In other cases, the emissions should be based on the composition of the waste stream routed to the flare.

1.4 Natural Gas Combustion

1.4.1 General[1-2]

Natural gas is one of the major combustion fuels used throughout the country. It is mainly used to generate industrial and utility electric power, produce industrial process steam and heat, and heat residential and commercial space. Natural gas consists of a high percentage of methane (generally above 85 percent) and varying amounts of ethane, propane, butane, and inerts (typically nitrogen, carbon dioxide, and helium). The average gross heating value of natural gas is approximately 1,020 British thermal units per standard cubic foot (Btu/scf), usually varying from 950 to 1,050 Btu/scf.

1.4.2 Firing Practices[3-5]

There are three major types of boilers used for natural gas combustion in commercial, industrial, and utility applications: watertube, firetube, and cast iron. Watertube boilers are designed to pass water through the inside of heat transfer tubes while the outside of the tubes is heated by direct contact with the hot combustion gases and through radiant heat transfer. The watertube design is the most common in utility and large industrial boilers. Watertube boilers are used for a variety of applications, ranging from providing large amounts of process steam, to providing hot water or steam for space heating, to generating high-temperature, high-pressure steam for producing electricity. Furthermore, watertube boilers can be distinguished either as field erected units or packaged units.

Field erected boilers are boilers that are constructed on site and comprise the larger sized watertube boilers. Generally, boilers with heat input levels greater than 100 MMBtu/hr, are field erected. Field erected units usually have multiple burners and, given the customized nature of their construction, also have greater operational flexibility and NO_x control options. Field erected units can also be further categorized as wall-fired or tangential-fired. Wall-fired units are characterized by multiple individual burners located on a single wall or on opposing walls of the furnace while tangential units have several rows of air and fuel nozzles located in each of the four corners of the boiler.

Package units are constructed off-site and shipped to the location where they are needed. While the heat input levels of packaged units may range up to 250 MMBtu/hr, the physical size of these units are constrained by shipping considerations and generally have heat input levels less than 100 MMBtu/hr. Packaged units are always wall-fired units with one or more individual burners. Given the size limitations imposed on packaged boilers, they have limited operational flexibility and cannot feasibly incorporate some NO_x control options.

Firetube boilers are designed such that the hot combustion gases flow through tubes, which heat the water circulating outside of the tubes. These boilers are used primarily for space heating systems, industrial process steam, and portable power boilers. Firetube boilers are almost exclusively packaged units. The two major types of firetube units are Scotch Marine boilers and the older firebox boilers. In cast iron boilers, as in firetube boilers, the hot gases are contained inside the tubes and the water being heated circulates outside the tubes. However, the units are constructed of cast iron rather than steel. Virtually all cast iron boilers are constructed as package boilers. These boilers are used to produce either low-pressure steam or hot water, and are most commonly used in small commercial applications.

Natural gas is also combusted in residential boilers and furnaces. Residential boilers and furnaces generally resemble firetube boilers with flue gas traveling through several channels or tubes with water or air circulated outside the channels or tubes.

1.4.3 Emissions[3-4]

The emissions from natural gas-fired boilers and furnaces include nitrogen oxides (NO_x), carbon monoxide (CO), and carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), volatile organic compounds (VOCs), trace amounts of sulfur dioxide (SO_2), and particulate matter (PM).

Nitrogen Oxides -

Nitrogen oxides formation occurs by three fundamentally different mechanisms. The principal mechanism of NO_x formation in natural gas combustion is thermal NO_x. The thermal NO_x mechanism occurs through the thermal dissociation and subsequent reaction of nitrogen (N_2) and oxygen (O_2) molecules in the combustion air. Most NO_x formed through the thermal NO_x mechanism occurs in the high temperature flame zone near the burners. The formation of thermal NO_x is affected by three furnace-zone factors: (1) oxygen concentration, (2) peak temperature, and (3) time of exposure at peak temperature. As these three factors increase, NO_x emission levels increase. The emission trends due to changes in these factors are fairly consistent for all types of natural gas-fired boilers and furnaces. Emission levels vary considerably with the type and size of combustor and with operating conditions (e.g., combustion air temperature, volumetric heat release rate, load, and excess oxygen level).

The second mechanism of NO_x formation, called prompt NO_x, occurs through early reactions of nitrogen molecules in the combustion air and hydrocarbon radicals from the fuel. Prompt NO_x reactions occur within the flame and are usually negligible when compared to the amount of NO_x formed through the thermal NO_x mechanism. However, prompt NO_x levels may become significant with ultra-low-NO_x burners.

The third mechanism of NO_x formation, called fuel NO_x, stems from the evolution and reaction of fuel-bound nitrogen compounds with oxygen. Due to the characteristically low fuel nitrogen content of natural gas, NO_x formation through the fuel NO_x mechanism is insignificant.

Carbon Monoxide -

The rate of CO emissions from boilers depends on the efficiency of natural gas combustion. Improperly tuned boilers and boilers operating at off-design levels decrease combustion efficiency resulting in increased CO emissions. In some cases, the addition of NO_x control systems such as low NO_x burners and flue gas recirculation (FGR) may also reduce combustion efficiency, resulting in higher CO emissions relative to uncontrolled boilers.

Volatile Organic Compounds -

The rate of VOC emissions from boilers and furnaces also depends on combustion efficiency. VOC emissions are minimized by combustion practices that promote high combustion temperatures, long residence times at those temperatures, and turbulent mixing of fuel and combustion air. Trace amounts of VOC species in the natural gas fuel (e.g., formaldehyde and benzene) may also contribute to VOC emissions if they are not completely combusted in the boiler.

Sulfur Oxides -

Emissions of SO_2 from natural gas-fired boilers are low because pipeline quality natural gas typically has sulfur levels of 2,000 grains per million cubic feet. However, sulfur-containing odorants are added to natural gas for detecting leaks, leading to small amounts of SO_2 emissions. Boilers combusting unprocessed natural gas may have higher SO_2 emissions due to higher levels of sulfur in the natural gas. For these units, a sulfur mass balance should be used to determine SO_2 emissions.

Particulate Matter -

Because natural gas is a gaseous fuel, filterable PM emissions are typically low. Particulate matter from natural gas combustion has been estimated to be less than 1 micrometer in size and has filterable and condensable fractions. Particulate matter in natural gas combustion are usually larger molecular weight hydrocarbons that are not fully combusted. Increased PM emissions may result from poor air/fuel mixing or maintenance problems.

Greenhouse Gases -[6-9]

CO_2, CH_4, and N_2O emissions are all produced during natural gas combustion. In properly tuned boilers, nearly all of the fuel carbon (99.9 percent) in natural gas is converted to CO_2 during the combustion process. This conversion is relatively independent of boiler or combustor type. Fuel carbon not converted to CO_2 results in CH_4, CO, and/or VOC emissions and is due to incomplete combustion. Even in boilers operating with poor combustion efficiency, the amount of CH_4, CO, and VOC produced is insignificant compared to CO_2 levels.

Formation of N_2O during the combustion process is affected by two furnace-zone factors. N_2O emissions are minimized when combustion temperatures are kept high (above 1475°F) and excess oxygen is kept to a minimum (less than 1 percent).

Methane emissions are highest during low-temperature combustion or incomplete combustion, such as the start-up or shut-down cycle for boilers. Typically, conditions that favor formation of N_2O also favor emissions of methane.

1.4.4 Controls[4,10]

NO_x Controls -

Currently, the two most prevalent combustion control techniques used to reduce NO_x emissions from natural gas-fired boilers are flue gas recirculation (FGR) and low NO_x burners. In an FGR system, a portion of the flue gas is recycled from the stack to the burner windbox. Upon entering the windbox, the recirculated gas is mixed with combustion air prior to being fed to the burner. The recycled flue gas consists of combustion products which act as inerts during combustion of the fuel/air mixture. The FGR system reduces NO_x emissions by two mechanisms. Primarily, the recirculated gas acts as a dilutent to reduce combustion temperatures, thus suppressing the thermal NO_x mechanism. To a lesser extent, FGR also reduces NO_x formation by lowering the oxygen concentration in the primary flame zone. The amount of recirculated flue gas is a key operating parameter influencing NO_x emission rates for these systems. An FGR system is normally used in combination with specially designed low NO_x burners capable of sustaining a stable flame with the increased inert gas flow resulting from the use of FGR. When low NO_x burners and FGR are used in combination, these techniques are capable of reducing NO_x emissions by 60 to 90 percent.

Low NO_x burners reduce NO_x by accomplishing the combustion process in stages. Staging partially delays the combustion process, resulting in a cooler flame which suppresses thermal NO_x formation. The two most common types of low NO_x burners being applied to natural gas-fired boilers are staged air burners and staged fuel burners. NO_x emission reductions of 40 to 85 percent (relative to uncontrolled emission levels) have been observed with low NO_x burners.

Other combustion control techniques used to reduce NO_x emissions include staged combustion and gas reburning. In staged combustion (e.g., burners-out-of-service and overfire air), the degree of staging is a key operating parameter influencing NO_x emission rates. Gas reburning is similar to the use of overfire in the use of combustion staging. However, gas reburning injects additional amounts of natural gas in the upper furnace, just before the overfire air ports, to provide increased reduction of NO_x to NO_2.

Two postcombustion technologies that may be applied to natural gas-fired boilers to reduce NO_x emissions are selective noncatalytic reduction (SNCR) and selective catalytic reduction (SCR). The SNCR system injects ammonia (NH_3) or urea into combustion flue gases (in a specific temperature zone) to reduce NO_x emission. The Alternative Control Techniques (ACT) document for NO_x emissions from utility boilers, maximum SNCR performance was estimated to range from 25 to 40 percent for natural gas-fired boilers.[12] Performance data available from several natural gas fired utility boilers with SNCR show a 24 percent reduction in NO_x for applications on wall-fired boilers and a 13 percent reduction in NO_x for applications on tangential-fired boilers.[11] In many situations, a boiler may have an SNCR system installed to trim NO_x emissions to meet permitted levels. In these cases, the SNCR system may not be operated to achieve maximum NO_x reduction. The SCR system involves injecting NH_3 into the flue gas in the presence of a catalyst to reduce NO_x emissions. No data were available on SCR performance on natural gas fired boilers at the time of this publication. However, the ACT Document for utility boilers estimates NO_x reduction efficiencies for SCR control ranging from 80 to 90 percent.[12]

Emission factors for natural gas combustion in boilers and furnaces are presented in Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4.[11] Tables in this section present emission factors on a volume basis ($lb/10^6$ scf). To convert to an energy basis (lb/MMBtu), divide by a heating value of 1,020 MMBtu/10^6 scf. For the purposes of developing emission factors, natural gas combustors have been organized into three general categories: large wall-fired boilers with greater than 100 MMBtu/hr of heat input, boilers and residential furnaces with less than 100 MMBtu/hr of heat input, and tangential-fired boilers. Boilers within these categories share the same general design and operating characteristics and hence have similar emission characteristics when combusting natural gas.

Emission factors are rated from A to E to provide the user with an indication of how "good" the factor is, with "A" being excellent and "E" being poor. The criteria that are used to determine a rating for an emission factor can be found in the Emission Factor Documentation for AP-42 Section 1.4 and in the introduction to the AP-42 document.

1.4.5 Updates Since the Fifth Edition

The Fifth Edition was released in January 1995. Revisions to this section are summarized below. For further detail, consult the Emission Factor Documentation for this section. These and other documents can be found on the Emission Factor and Inventory Group (EFIG) home page (http://www.epa.gov/ttn/chief).

Supplement D, March 1998

- Text was revised concerning Firing Practices, Emissions, and Controls.
- All emission factors were updated based on 482 data points taken from 151 source tests. Many new emission factors have been added for speciated organic compounds, including hazardous air pollutants.

July 1998 - minor changes

- Footnote D was added to table 1.4-3 to explain why the sum of individual HAP may exceed VOC or TOC, the web address was updated, and the references were reordered.

TABLE 1.4-2. EMISSION FACTORS FOR CRITERIA POLLUTANTS AND GREENHOUSE GASES FROM NATURAL GAS COMBUSTION[a]

Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
CO_2[b]	120,000	A
Lead	0.0005	D
N_2O (Uncontrolled)	2.2	E
N_2O (Controlled-low-NO_X burner)	0.64	E
PM (Total)[c]	7.6	D
PM (Condensable)[c]	5.7	D
PM (Filterable)[c]	1.9	B
SO_2[d]	0.6	A
TOC	11	B
Methane	2.3	B
VOC	5.5	C

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. To convert from $lb/10^6$ scf to 1b/MMBtu, divide by 1,020. The emission factors in this table may be converted to other natural gas heating values by multiplying the given emission factor by the ratio of the specified heating value to this average heating value. TOC = Total Organic Compounds. VOC = Volatile Organic Compounds.

[b] Based on approximately 100% conversion of fuel carbon to CO_2. $CO_2[lb/10^6 \text{ scf}] = (3.67)(CON)(C)(D)$, where CON = fractional conversion of fuel carbon to CO_2, C = carbon content of fuel by weight (0.76), and D = density of fuel, 4.2×10^4 $lb/10^6$ scf.

[c] All PM (total, condensible, and filterable) is assumed to be less than 1.0 micrometer in diameter. Therefore, the PM emission factors presented here may be used to estimate PM_{10}, $PM_{2.5}$ or PM_1 emissions. Total PM is the sum of the filterable PM and condensible PM. Condensible PM is the particulate matter collected using EPA Method 202 (or equivalent). Filterable PM is the particulate matter collected on, or prior to, the filter of an EPA Method 5 (or equivalent) sampling train.

[d] Based on 100% conversion of fuel sulfur to SO_2. Assumes sulfur content is natural gas of 2,000 grains/10^6 scf. The SO_2 emission factor in this table can be converted to other natural gas sulfur contents by multiplying the SO_2 emission factor by the ratio of the site-specific sulfur content (grains/10^6 scf) to 2,000 grains/10^6 scf.

TABLE 1.4-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM NATURAL GAS COMBUSTION[a]

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
91-57-6	2-Methylnaphthalene[b, c]	2.4E-05	D
56-49-5	3-Methylcholanthrene[b, c]	<1.8E-06	E
	7,12-Dimethylbenz(a)anthracene[b,c]	<1.6E-05	E
83-32-9	Acenaphthene[b,c]	<1.8E-06	E
203-96-8	Acenaphthylene[b,c]	<1.8E-06	E
120-12-7	Anthracene[b,c]	<2.4E-06	E
56-55-3	Benz(a)anthracene[b,c]	<1.8E-06	E
71-43-2	Benzene[b]	2.1E-03	B
50-32-8	Benzo(a)pyrene[b,c]	<1.2E-06	E
205-99-2	Benzo(b)fluoranthene[b,c]	<1.8E-06	E
191-24-2	Benzo(g,h,i)perylene[b,c]	<1.2E-06	E
207-08-9	Benzo(k)fluoranthene[b,c]	<1.8E-06	E
106-97-8	Butane	2.1E+00	E
218-01-9	Chrysene[b,c]	<1.8E-06	E
53-70-3	Dibenzo(a,h)anthracene[b,c]	<1.2E-06	E
25321-22-6	Dichlorobenzene[b]	1.2E-03	E
74-84-0	Ethane	3.1E+00	E
206-44-0	Fluoranthene[b,c]	3.0E-06	E
86-73-7	Fluorene[b,c]	2.8E-06	E
50-00-0	Formaldehyde[b]	7.5E-02	B
110-54-3	Hexane[b]	1.8E+00	E
193-39-5	Indeno(1,2,3-cd)pyrene[b,c]	<1.8E-06	E
91-20-3	Naphthalene[b]	6.1E-04	E
109-66-0	Pentane	2.6E+00	E
85-01-8	Phenanathrene[b,c]	1.7E-05	D
74-98-6	Propane	1.6E+00	E

TABLE 1.4-3. EMISSION FACTORS FOR SPECIATED ORGANIC COMPOUNDS FROM NATURAL GAS COMBUSTION (Continued)

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
129-00-0	Pyrene[b, c]	5.0E-06	E
108-88-3	Toluene[b]	3.4E-03	C

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by 16. To convert from $1b/10^6$ scf to lb/MMBtu, divide by 1,020. Emission Factors preceeded with a less-than symbol are based on method detection limits.

[b] Hazardous Air Pollutant (HAP) as defined by Section 112(b) of the Clean Air Act.

[c] HAP because it is Polycyclic Organic Matter (POM). POM is a HAP as defined by Section 112(b) of the Clean Air Act.

[d] The sum of individual organic compounds may exceed the VOC and TOC emission factors due to differences in test methods and the availability of test data for each pollutant.

TABLE 1.4-4. EMISSION FACTORS FOR METALS FROM NATURAL GAS COMBUSTION[a]

CAS No.	Pollutant	Emission Factor ($lb/10^6$ scf)	Emission Factor Rating
7440-38-2	Arsenic[b]	2.0E-04	E
7440-39-3	Barium	4.4E-03	D
7440-41-7	Beryllium[b]	<1.2E-05	E
7440-43-9	Cadmium[b]	1.1E-03	D
7440-47-3	Chromium[b]	1.4E-03	D
7440-48-4	Cobalt[b]	8.4E-05	D
7440-50-8	Copper	8.5E-04	C
7439-96-5	Manganese[b]	3.8E-04	D
7439-97-6	Mercury[b]	2.6E-04	D
7439-98-7	Molybdenum	1.1E-03	D
7440-02-0	Nickel[b]	2.1E-03	C
7782-49-2	Selenium[b]	<2.4E-05	E
7440-62-2	Vanadium	2.3E-03	D
7440-66-6	Zinc	2.9E-02	E

[a] Reference 11. Units are in pounds of pollutant per million standard cubic feet of natural gas fired. Data are for all natural gas combustion sources. Emission factors preceeded by a less-than symbol are based on method detection limits. To convert from $lb/10^6$ scf to $kg/10^6$ m^3, multiply by l6. To convert from $lb/10^6$ scf to 1b/MMBtu, divide by 1,020.

[b] Hazardous Air Pollutant as defined by Section 112(b) of the Clean Air Act.

References For Section 1.4

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3. *Background Information Document For Industrial Boilers*, EPA-450/3-82-006a, U. S. Environmental Protection Agency, Research Triangle Park, NC, March 1982.

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10. J. P. Kesselring and W. V. Krill, "A Low-NO_x Burner For Gas-Fired Firetube Boilers", *Proceedings: 1985 Symposium On Stationary Combustion NO_x Control, Volume 2*, EPRI CS-4360, Electric Power Research Institute, Palo Alto, CA, January 1986.

11. *Emission Factor Documentation for AP-42 Section 1.4—Natural Gas Combustion*, Technical Support Division, Office of Air Quality Planning and Standards, U. S. Environmental Protection Agency, Research Triangle Park, NC, 1997.

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GRI-GLYCalc VERSION 4.0 - SUMMARY OF INPUT VALUES

Case Name: Washington Ranch Strorage Facility
File Name: C:\Users\Jaimy.Karacaoglu\Trinity Consultants, Inc\Kinder Morgan - 213201.0167 NSR Tech Rev\06 CALCULATIONS\Washington Ranch GlyCalc_v0.1_2021 1129 JMK.ddf
Date: December 10, 2021

DESCRIPTION:

Description:

Annual Hours of Operation: 8760.0 hours/yr

WET GAS:

Temperature: 70.00 deg. F
Pressure: 617.00 psig
Wet Gas Water Content: Subsaturated
Specified Wet Gas Water Content: 20.00 lbs. H2O/MMSCF

Component	Conc. (vol %)
Carbon Dioxide	0.6740
Nitrogen	1.4890
Methane	94.6650
Ethane	2.5370
Propane	0.3990
Isobutane	0.0550
n-Butane	0.0820
Isopentane	0.0260
n-Pentane	0.0200
Cyclopentane	0.0110
n-Hexane	0.0050
Other Hexanes	0.0120
Heptanes	0.0120
Benzene	0.0010
Toluene	0.0020
Ethylbenzene	0.0010
Xylenes	0.0010
C8+ Heavies	0.0100

DRY GAS:

Flow Rate: 250.0 MMSCF/day
Water Content: 2.3 lbs. H2O/MMSCF

LEAN GLYCOL:

Glycol Type: TEG
Water Content: 1.5 wt% H2O
Flow Rate: 22.0 gpm

PUMP:

Glycol Pump Type: Electric/Pneumatic

FLASH TANK:

Flash Control: Recycle/recompression
Temperature: 170.0 deg. F
Pressure: 85.0 psig

REGENERATOR OVERHEADS CONTROL DEVICE:

Control Device: Condenser
Temperature: 170.0 deg. F
Pressure: 12.8 psia

RICH/LEAN ANALYSIS:

Component	Rich Glycol (mg/L)	Lean Glycol (mg/L)
Benzene	81.0	7.00
Toluene	183.0	22.00
Ethylbenzene	14.0	0.00
Xylenes	114.0	10.00

GRI-GLYCalc VERSION 4.0 - EMISSIONS SUMMARY

Case Name: Washington Ranch Strorage Facility
File Name: C:\Users\Jaimy.Karacaoglu\Trinity Consultants, Inc\Kinder Morgan - 213201.0167 NSR Tech Rev\06 CALCULATIONS\Washington Ranch GlyCalc_v0.1_2021 1129 JMK.ddf
Date: December 10, 2021

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	3.7395	89.749	16.3792
Ethane	1.6800	40.319	7.3582
Propane	1.0789	25.893	4.7254
Isobutane	0.3532	8.477	1.5471
n-Butane	0.7839	18.814	3.4336
Isopentane	0.3467	8.321	1.5186
n-Pentane	0.3779	9.071	1.6554
Cyclopentane	1.1078	26.588	4.8523
n-Hexane	0.2355	5.652	1.0314
Other Hexanes	0.3946	9.470	1.7283
Heptanes	1.4671	35.209	6.4257
Benzene	0.8003	19.207	3.5052
Toluene	1.6572	39.772	7.2585
Ethylbenzene	0.1191	2.858	0.5216
Xylenes	0.9585	23.003	4.1981
C8+ Heavies	1.4754	35.409	6.4621
Total Emissions	16.5755	397.811	72.6006
Total Hydrocarbon Emissions	16.5755	397.811	72.6006
Total VOC Emissions	11.1560	267.743	48.8632
Total HAP Emissions	3.7705	90.492	16.5147
Total BTEX Emissions	3.5350	84.840	15.4833

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	3.7405	89.771	16.3832
Ethane	1.6812	40.348	7.3634
Propane	1.0816	25.959	4.7375
Isobutane	0.3547	8.512	1.5535
n-Butane	0.7880	18.913	3.4517
Isopentane	0.3502	8.405	1.5339
n-Pentane	0.3825	9.180	1.6754
Cyclopentane	1.1285	27.085	4.9430
n-Hexane	0.2413	5.791	1.0568
Other Hexanes	0.4030	9.671	1.7649
Heptanes	1.5514	37.233	6.7949
Benzene	0.8333	19.998	3.6497
Toluene	1.8137	43.528	7.9438
Ethylbenzene	0.1408	3.380	0.6168
Xylenes	1.1711	28.106	5.1294
C8+ Heavies	6.4226	154.144	28.1312
Total Emissions	22.0843	530.023	96.7292
Total Hydrocarbon Emissions	22.0843	530.023	96.7292
Total VOC Emissions	16.6627	399.904	72.9826

Total HAP Emissions	4.2001	100.803	18.3965
Total BTEX Emissions	3.9588	95.012	17.3397

FLASH GAS EMISSIONS

Note: Flash Gas Emissions are zero with the Recycle/recompression control option.

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	21.6580	519.793	94.8622
Ethane	3.1382	75.316	13.7453
Propane	1.0245	24.589	4.4874
Isobutane	0.2433	5.839	1.0656
n-Butane	0.4313	10.351	1.8890
Isopentane	0.1789	4.294	0.7836
n-Pentane	0.1613	3.872	0.7066
Cyclopentane	0.1213	2.911	0.5313
n-Hexane	0.0621	1.490	0.2720
Other Hexanes	0.1319	3.167	0.5779
Heptanes	0.2154	5.169	0.9433
Benzene	0.0097	0.233	0.0425
Toluene	0.0150	0.360	0.0656
Ethylbenzene	0.0007	0.017	0.0031
Xylenes	0.0040	0.097	0.0177
C8+ Heavies	0.3279	7.870	1.4362
Total Emissions	27.7236	665.366	121.4293
Total Hydrocarbon Emissions	27.7236	665.366	121.4293
Total VOC Emissions	2.9274	70.257	12.8219
Total HAP Emissions	0.0915	2.197	0.4009
Total BTEX Emissions	0.0294	0.706	0.1289

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Washington Ranch Strorage Facility
File Name: C:\Users\Jaimy.Karacaoglu\Trinity Consultants, Inc\Kinder Morgan - 213201.0167 NSR Tech Rev\06 CALCULATIONS\Washington Ranch GlyCalc_v0.1_2021 1129 JMK.ddf
Date: December 10, 2021

DESCRIPTION:

Description:

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	3.7395	89.749	16.3792
Ethane	1.6800	40.319	7.3582
Propane	1.0789	25.893	4.7254
Isobutane	0.3532	8.477	1.5471
n-Butane	0.7839	18.814	3.4336
Isopentane	0.3467	8.321	1.5186
n-Pentane	0.3779	9.071	1.6554
Cyclopentane	1.1078	26.588	4.8523
n-Hexane	0.2355	5.652	1.0314
Other Hexanes	0.3946	9.470	1.7283
Heptanes	1.4671	35.209	6.4257
Benzene	0.8003	19.207	3.5052
Toluene	1.6572	39.772	7.2585
Ethylbenzene	0.1191	2.858	0.5216
Xylenes	0.9585	23.003	4.1981
C8+ Heavies	1.4754	35.409	6.4621
Total Emissions	16.5755	397.811	72.6006
Total Hydrocarbon Emissions	16.5755	397.811	72.6006
Total VOC Emissions	11.1560	267.743	48.8632
Total HAP Emissions	3.7705	90.492	16.5147
Total BTEX Emissions	3.5350	84.840	15.4833

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	3.7405	89.771	16.3832
Ethane	1.6812	40.348	7.3634
Propane	1.0816	25.959	4.7375
Isobutane	0.3547	8.512	1.5535
n-Butane	0.7880	18.913	3.4517
Isopentane	0.3502	8.405	1.5339
n-Pentane	0.3825	9.180	1.6754
Cyclopentane	1.1285	27.085	4.9430
n-Hexane	0.2413	5.791	1.0568
Other Hexanes	0.4030	9.671	1.7649
Heptanes	1.5514	37.233	6.7949

Benzene	0.8333	19.998	3.6497
Toluene	1.8137	43.528	7.9438
Ethylbenzene	0.1408	3.380	0.6168
Xylenes	1.1711	28.106	5.1294
C8+ Heavies	6.4226	154.144	28.1312
Total Emissions	22.0843	530.023	96.7292
Total Hydrocarbon Emissions	22.0843	530.023	96.7292
Total VOC Emissions	16.6627	399.904	72.9826
Total HAP Emissions	4.2001	100.803	18.3965
Total BTEX Emissions	3.9588	95.012	17.3397

FLASH GAS EMISSIONS

Note: Flash Gas Emissions are zero with the Recycle/recompression control option.

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	21.6580	519.793	94.8622
Ethane	3.1382	75.316	13.7453
Propane	1.0245	24.589	4.4874
Isobutane	0.2433	5.839	1.0656
n-Butane	0.4313	10.351	1.8890
Isopentane	0.1789	4.294	0.7836
n-Pentane	0.1613	3.872	0.7066
Cyclopentane	0.1213	2.911	0.5313
n-Hexane	0.0621	1.490	0.2720
Other Hexanes	0.1319	3.167	0.5779
Heptanes	0.2154	5.169	0.9433
Benzene	0.0097	0.233	0.0425
Toluene	0.0150	0.360	0.0656
Ethylbenzene	0.0007	0.017	0.0031
Xylenes	0.0040	0.097	0.0177
C8+ Heavies	0.3279	7.870	1.4362
Total Emissions	27.7236	665.366	121.4293
Total Hydrocarbon Emissions	27.7236	665.366	121.4293
Total VOC Emissions	2.9274	70.257	12.8219
Total HAP Emissions	0.0915	2.197	0.4009
Total BTEX Emissions	0.0294	0.706	0.1289

EQUIPMENT REPORTS:

CONDENSER

Condenser Outlet Temperature:	170.00 deg. F
Condenser Pressure:	12.80 psia
Condenser Duty:	1.34e-001 MM BTU/hr
Hydrocarbon Recovery:	0.44 bbls/day
Produced Water:	12.59 bbls/day

VOC Control Efficiency:	33.05 %
HAP Control Efficiency:	10.23 %
BTEX Control Efficiency:	10.71 %
Dissolved Hydrocarbons in Water:	108.67 mg/L

Component	Emitted	Condensed
Water	4.57%	95.43%
Carbon Dioxide	99.77%	0.23%
Nitrogen	99.99%	0.01%
Methane	99.98%	0.02%
Ethane	99.93%	0.07%
Propane	99.75%	0.25%
Isobutane	99.58%	0.42%
n-Butane	99.48%	0.52%
Isopentane	99.00%	1.00%
n-Pentane	98.81%	1.19%
Cyclopentane	98.16%	1.84%
n-Hexane	97.60%	2.40%
Other Hexanes	97.92%	2.08%
Heptanes	94.57%	5.43%
Benzene	96.04%	3.96%
Toluene	91.37%	8.63%
Ethylbenzene	84.56%	15.44%
Xylenes	81.84%	18.16%
C8+ Heavies	22.97%	77.03%

ABSORBER

NOTE: Because the Calculated Absorber Stages was below the minimum allowed, GRI-GLYCalc has set the number of Absorber Stages to 1.25 and has calculated a revised Dry Gas Dew Point.

Calculated Absorber Stages:	1.25
Calculated Dry Gas Dew Point:	1.51 lbs. H2O/MMSCF
Temperature:	70.0 deg. F
Pressure:	617.0 psig
Dry Gas Flow Rate:	250.0000 MMSCF/day
Glycol Losses with Dry Gas:	0.3787 lb/hr
Wet Gas Water Content:	Subsaturated
Specified Wet Gas Water Content:	20.00 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	6.85 gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	7.57%	92.43%
Carbon Dioxide	99.89%	0.11%
Nitrogen	99.99%	0.01%
Methane	99.99%	0.01%
Ethane	99.98%	0.02%
Propane	99.96%	0.04%
Isobutane	99.93%	0.07%
n-Butane	99.91%	0.09%
Isopentane	99.90%	0.10%
n-Pentane	99.86%	0.14%
Cyclopentane	99.41%	0.59%
n-Hexane	99.74%	0.26%
Other Hexanes	99.81%	0.19%
Heptanes	99.47%	0.53%

Benzene	89.29%	10.71%
Toluene	83.06%	16.94%
Ethylbenzene	74.65%	25.35%
Xylenes	64.48%	35.52%
C8+ Heavies	98.56%	1.44%

FLASH TANK

Flash Control: Recycle/recompression
Flash Temperature: 170.0 deg. F
Flash Pressure: 85.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.96%	0.04%
Carbon Dioxide	60.48%	39.52%
Nitrogen	14.44%	85.56%
Methane	14.73%	85.27%
Ethane	34.88%	65.12%
Propane	51.36%	48.64%
Isobutane	59.31%	40.69%
n-Butane	64.63%	35.37%
Isopentane	66.36%	33.64%
n-Pentane	70.49%	29.51%
Cyclopentane	90.34%	9.66%
n-Hexane	79.63%	20.37%
Other Hexanes	75.58%	24.42%
Heptanes	87.87%	12.13%
Benzene	98.95%	1.05%
Toluene	99.28%	0.72%
Ethylbenzene	99.55%	0.45%
Xylenes	99.69%	0.31%
C8+ Heavies	95.73%	4.27%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	49.11%	50.89%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	0.75%	99.25%
n-Pentane	0.71%	99.29%
Cyclopentane	0.55%	99.45%
n-Hexane	0.63%	99.37%
Other Hexanes	1.32%	98.68%
Heptanes	0.57%	99.43%
Benzene	8.47%	91.53%

Toluene	11.79%	88.21%
Ethylbenzene	10.45%	89.55%
Xylenes	8.60%	91.40%
C8+ Heavies	12.54%	87.46%

STREAM REPORTS:

WET GAS STREAM

Temperature: 70.00 deg. F
Pressure: 631.70 psia
Flow Rate: 1.04e+007 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	4.21e-002	2.08e+002
Carbon Dioxide	6.74e-001	8.15e+003
Nitrogen	1.49e+000	1.15e+004
Methane	9.46e+001	4.17e+005
Ethane	2.54e+000	2.10e+004
Propane	3.99e-001	4.83e+003
Isobutane	5.50e-002	8.78e+002
n-Butane	8.20e-002	1.31e+003
Isopentane	2.60e-002	5.15e+002
n-Pentane	2.00e-002	3.96e+002
Cyclopentane	1.10e-002	2.12e+002
n-Hexane	5.00e-003	1.18e+002
Other Hexanes	1.20e-002	2.84e+002
Heptanes	1.20e-002	3.30e+002
Benzene	3.67e-004	7.87e+000
Toluene	4.27e-004	1.08e+001
Ethylbenzene	1.91e-005	5.58e-001
Xylenes	1.13e-004	3.31e+000
C8+ Heavies	1.00e-002	4.68e+002
Total Components	100.00	4.67e+005

DRY GAS STREAM

Temperature: 70.00 deg. F
Pressure: 631.70 psia
Flow Rate: 1.04e+007 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	3.19e-003	1.58e+001
Carbon Dioxide	6.74e-001	8.14e+003
Nitrogen	1.49e+000	1.15e+004
Methane	9.47e+001	4.17e+005
Ethane	2.54e+000	2.09e+004
Propane	3.99e-001	4.83e+003
Isobutane	5.50e-002	8.77e+002
n-Butane	8.20e-002	1.31e+003
Isopentane	2.60e-002	5.15e+002
n-Pentane	2.00e-002	3.96e+002

Cyclopentane	1.09e-002	2.11e+002
n-Hexane	4.99e-003	1.18e+002
Other Hexanes	1.20e-002	2.84e+002
Heptanes	1.19e-002	3.29e+002
Benzene	3.28e-004	7.03e+000
Toluene	3.54e-004	8.97e+000
Ethylbenzene	1.43e-005	4.17e-001
Xylenes	7.32e-005	2.13e+000
C8+ Heavies	9.86e-003	4.61e+002
Total Components	100.00	4.67e+005

LEAN GLYCOL STREAM

Temperature: 70.00 deg. F
Flow Rate: 2.20e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	1.22e+004
Water	1.50e+000	1.86e+002
Carbon Dioxide	7.05e-012	8.74e-010
Nitrogen	6.07e-013	7.52e-011
Methane	6.89e-018	8.53e-016
Ethane	1.84e-008	2.27e-006
Propane	6.92e-010	8.57e-008
Isobutane	1.45e-010	1.79e-008
n-Butane	2.44e-010	3.02e-008
Isopentane	2.15e-005	2.66e-003
n-Pentane	2.21e-005	2.73e-003
Cyclopentane	5.07e-005	6.28e-003
n-Hexane	1.23e-005	1.52e-003
Other Hexanes	4.36e-005	5.40e-003
Heptanes	7.17e-005	8.88e-003
Benzene	6.23e-004	7.71e-002
Toluene	1.96e-003	2.42e-001
Ethylbenzene	1.33e-004	1.64e-002
Xylenes	8.89e-004	1.10e-001
C8+ Heavies	7.43e-003	9.21e-001
Total Components	100.00	1.24e+004

RICH GLYCOL STREAM

Temperature: 70.00 deg. F
Pressure: 631.70 psia
Flow Rate: 2.25e+001 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.65e+001	1.22e+004
Water	2.99e+000	3.78e+002
Carbon Dioxide	6.91e-002	8.74e+000
Nitrogen	5.95e-003	7.51e-001
Methane	2.01e-001	2.54e+001
Ethane	3.81e-002	4.82e+000
Propane	1.67e-002	2.11e+000
Isobutane	4.73e-003	5.98e-001

n-Butane	9.65e-003	1.22e+000
Isopentane	4.21e-003	5.32e-001
n-Pentane	4.32e-003	5.47e-001
Cyclopentane	9.94e-003	1.26e+000
n-Hexane	2.41e-003	3.05e-001
Other Hexanes	4.27e-003	5.40e-001
Heptanes	1.40e-002	1.78e+000
Benzene	7.28e-003	9.20e-001
Toluene	1.64e-002	2.07e+000
Ethylbenzene	1.25e-003	1.58e-001
Xylenes	1.02e-002	1.29e+000
C8+ Heavies	6.07e-002	7.67e+000
Total Components	100.00	1.26e+004

FLASH TANK OFF GAS STREAM

Temperature: 170.00 deg. F
Pressure: 99.70 psia
Flow Rate: 6.11e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	4.62e-001	1.34e-001
Carbon Dioxide	4.87e+000	3.45e+000
Nitrogen	1.42e+000	6.43e-001
Methane	8.38e+001	2.17e+001
Ethane	6.48e+000	3.14e+000
Propane	1.44e+000	1.02e+000
Isobutane	2.60e-001	2.43e-001
n-Butane	4.60e-001	4.31e-001
Isopentane	1.54e-001	1.79e-001
n-Pentane	1.39e-001	1.61e-001
Cyclopentane	1.07e-001	1.21e-001
n-Hexane	4.47e-002	6.21e-002
Other Hexanes	9.50e-002	1.32e-001
Heptanes	1.33e-001	2.15e-001
Benzene	7.70e-003	9.70e-003
Toluene	1.01e-002	1.50e-002
Ethylbenzene	4.15e-004	7.09e-004
Xylenes	2.36e-003	4.04e-003
C8+ Heavies	1.19e-001	3.28e-001
Total Components	100.00	3.20e+001

FLASH TANK GLYCOL STREAM

Temperature: 170.00 deg. F
Flow Rate: 2.24e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.68e+001	1.22e+004
Water	3.00e+000	3.78e+002
Carbon Dioxide	4.19e-002	5.28e+000
Nitrogen	8.61e-004	1.09e-001
Methane	2.97e-002	3.74e+000
Ethane	1.33e-002	1.68e+000

Propane	8.58e-003	1.08e+000
Isobutane	2.81e-003	3.55e-001
n-Butane	6.25e-003	7.88e-001
Isopentane	2.80e-003	3.53e-001
n-Pentane	3.06e-003	3.85e-001
Cyclopentane	9.00e-003	1.13e+000
n-Hexane	1.93e-003	2.43e-001
Other Hexanes	3.24e-003	4.08e-001
Heptanes	1.24e-002	1.56e+000
Benzene	7.22e-003	9.10e-001
Toluene	1.63e-002	2.06e+000
Ethylbenzene	1.25e-003	1.57e-001
Xylenes	1.02e-002	1.28e+000
C8+ Heavies	5.82e-002	7.34e+000
Total Components	100.00	1.26e+004

FLASH GAS EMISSIONS

Control Method: Recycle/recompression
Control Efficiency: 100.00

Note: Flash Gas Emissions are zero with the Recycle/recompression control option.

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 4.28e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.48e+001	1.93e+002
Carbon Dioxide	1.06e+000	5.28e+000
Nitrogen	3.44e-002	1.09e-001
Methane	2.07e+000	3.74e+000
Ethane	4.96e-001	1.68e+000
Propane	2.17e-001	1.08e+000
Isobutane	5.41e-002	3.55e-001
n-Butane	1.20e-001	7.88e-001
Isopentane	4.30e-002	3.50e-001
n-Pentane	4.70e-002	3.83e-001
Cyclopentane	1.43e-001	1.13e+000
n-Hexane	2.48e-002	2.41e-001
Other Hexanes	4.15e-002	4.03e-001
Heptanes	1.37e-001	1.55e+000
Benzene	9.46e-002	8.33e-001
Toluene	1.75e-001	1.81e+000
Ethylbenzene	1.18e-002	1.41e-001
Xylenes	9.78e-002	1.17e+000
C8+ Heavies	3.34e-001	6.42e+000
Total Components	100.00	2.20e+002

CONDENSER VENT GAS STREAM

Temperature: 170.00 deg. F

Pressure: 12.80 psia
Flow Rate: 3.95e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	4.70e+001	8.80e+000
Carbon Dioxide	1.15e+001	5.27e+000
Nitrogen	3.72e-001	1.09e-001
Methane	2.24e+001	3.74e+000
Ethane	5.37e+000	1.68e+000
Propane	2.35e+000	1.08e+000
Isobutane	5.84e-001	3.53e-001
n-Butane	1.30e+000	7.84e-001
Isopentane	4.62e-001	3.47e-001
n-Pentane	5.04e-001	3.78e-001
Cyclopentane	1.52e+000	1.11e+000
n-Hexane	2.63e-001	2.35e-001
Other Hexanes	4.40e-001	3.95e-001
Heptanes	1.41e+000	1.47e+000
Benzene	9.85e-001	8.00e-001
Toluene	1.73e+000	1.66e+000
Ethylbenzene	1.08e-001	1.19e-001
Xylenes	8.68e-001	9.58e-001
C8+ Heavies	8.33e-001	1.48e+000
Total Components	100.00	3.08e+001

CONDENSER PRODUCED WATER STREAM

Temperature: 170.00 deg. F
Flow Rate: 3.67e-001 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
Water	1.00e+002	1.84e+002	999832.
Carbon Dioxide	5.92e-003	1.09e-002	59.
Nitrogen	4.41e-006	8.11e-006	0.
Methane	2.61e-004	4.80e-004	3.
Ethane	1.24e-004	2.29e-004	1.
Propane	1.04e-004	1.91e-004	1.
Isobutane	1.76e-005	3.24e-005	0.
n-Butane	4.92e-005	9.05e-005	0.
Isopentane	1.44e-005	2.64e-005	0.
n-Pentane	1.64e-005	3.01e-005	0.
Cyclopentane	2.88e-004	5.29e-004	3.
n-Hexane	7.75e-006	1.42e-005	0.
Other Hexanes	1.08e-005	1.99e-005	0.
Heptanes	2.53e-005	4.64e-005	0.
Benzene	2.84e-003	5.22e-003	28.
Toluene	4.48e-003	8.23e-003	45.
Ethylbenzene	2.27e-004	4.16e-004	2.
Xylenes	2.40e-003	4.41e-003	24.
C8+ Heavies	4.36e-006	8.02e-006	0.
Total Components	100.00	1.84e+002	1000000.

CONDENSER RECOVERED OIL STREAM

Temperature: 170.00 deg. F
Flow Rate: 1.29e-002 gpm

Component	Conc. (wt%)	Loading (lb/hr)
Water	3.43e-002	1.89e-003
Carbon Dioxide	2.29e-002	1.26e-003
Nitrogen	3.95e-005	2.17e-006
Methane	8.08e-003	4.44e-004
Ethane	1.77e-002	9.70e-004
Propane	4.67e-002	2.56e-003
Isobutane	2.62e-002	1.44e-003
n-Butane	7.34e-002	4.03e-003
Isopentane	6.34e-002	3.48e-003
n-Pentane	8.26e-002	4.54e-003
Cyclopentane	3.68e-001	2.02e-002
n-Hexane	1.05e-001	5.78e-003
Other Hexanes	1.52e-001	8.35e-003
Heptanes	1.53e+000	8.42e-002
Benzene	5.05e-001	2.78e-002
Toluene	2.70e+000	1.48e-001
Ethylbenzene	3.88e-001	2.13e-002
Xylenes	3.79e+000	2.08e-001
C8+ Heavies	9.01e+001	4.95e+000
Total Components	100.00	5.49e+000

Section 8

Map(s)

A map such as a 7.5 minute topographic quadrangle showing the exact location of the source. The map shall also include the following:

The UTM or Longitudinal coordinate system on both axes	An indicator showing which direction is north
A minimum radius around the plant of 0.8km (0.5 miles)	Access and haul roads
Topographic features of the area	Facility property boundaries
The name of the map	The area which will be restricted to public access
A graphical scale	

A map has been included in this section.

Section 9

Proof of Public Notice

(for NSR applications submitting under 20.2.72 or 20.2.74 NMAC)
(This proof is required by: 20.2.72.203.A.14 NMAC "Documentary Proof of applicant's public notice")

☐ **I have read the AQB "Guidelines for Public Notification for Air Quality Permit Applications"**
This document provides detailed instructions about public notice requirements for various permitting actions. It also provides public notice examples and certification forms. Material mistakes in the public notice will require a re-notice before issuance of the permit.

Unless otherwise allowed elsewhere in this document, the following items document proof of the applicant's Public Notification. Please include this page in your proof of public notice submittal with checkmarks indicating which documents are being submitted with the application.

New Permit and **Significant Permit Revision** public notices must include all items in this list.

Technical Revision public notices require only items 1, 5, 9, and 10.

Per the Guidelines for Public Notification document mentioned above, include:

1. ☐ A copy of the certified letter receipts with post marks (20.2.72.203.B NMAC)
2. ☐ A list of the places where the public notice has been posted in at least four publicly accessible and conspicuous places, including the proposed or existing facility entrance. (e.g: post office, library, grocery, etc.)
3. ☐ A copy of the property tax record (20.2.72.203.B NMAC).
4. ☐ A sample of the letters sent to the owners of record.
5. ☐ A sample of the letters sent to counties, municipalities, and Indian tribes.
6. ☐ A sample of the public notice posted and a verification of the local postings.
7. ☐ A table of the noticed citizens, counties, municipalities and tribes and to whom the notices were sent in each group.
8. ☐ A copy of the public service announcement (PSA) sent to a local radio station and documentary proof of submittal.
9. ☐ A copy of the classified or legal ad including the page header (date and newspaper title) or its affidavit of publication stating the ad date, and a copy of the ad. When appropriate, this ad shall be printed in both English and Spanish.
10. ☐ A copy of the display ad including the page header (date and newspaper title) or its affidavit of publication stating the ad date, and a copy of the ad. When appropriate, this ad shall be printed in both English and Spanish.
11. ☐ A map with a graphic scale showing the facility boundary and the surrounding area in which owners of record were notified by mail. This is necessary for verification that the correct facility boundary was used in determining distance for notifying land owners of record.

N/A- This application is being submitted under 20.2.70 NMAC.

Section 10

Written Description of the Routine Operations of the Facility

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A written description of the routine operations of the facility. Include a description of how each piece of equipment will be operated, how controls will be used, and the fate of both the products and waste generated. For modifications and/or revisions, explain how the changes will affect the existing process. In a separate paragraph describe the major process bottlenecks that limit production. The purpose of this description is to provide sufficient information about plant operations for the permit writer to determine appropriate emission sources.

Washington Ranch is a natural gas storage facility which compresses natural gas into underground storage wells and withdraws the gas for delivery into the pipeline. Natural gas is injected or withdrawn from wells using reciprocating gas-fired compressor engines (Units 1 and 2). During natural gas withdrawal operations, the gas is routed through a heater (Unit 4) to prevent hydrate formations then to a triethylene glycol dehydrator (Units 3a and 3b) to remove moisture and hydrocarbons. The process flare (Unit 6) controls emissions from the dehydrator condenser.

Additional sources include a natural gas-fired reciprocating auxiliary engine used up to 500 hours per year (Unit 5), a diesel fire water pump (Unit Pump), facility-wide fugitive emissions (Unit FUG), and emissions from startup, shutdown, and maintenance/ malfunction (Unit SSM/M1)

Section 19

Requirements for Title V Program

Do not print this section unless this is a Title V application.

Who Must Use this Attachment:

* Any major source as defined in 20.2.70 NMAC.
* Any source, including an area source, subject to a standard or other requirement promulgated under Section 111 - Standards of Performance for New Stationary Sources, or Section 112 Hazardous Air Pollutants, of the 1990 federal Clean Air Act ("federal Act"). Non-major sources subject to Sections 111 or 112 of the federal Act are exempt from the obligation to obtain an 20.2.70 NMAC operating permit until such time that the EPA Administrator completes rulemakings that require such sources to obtain operating permits. In addition, sources that would be required to obtain an operating permit solely because they are subject to regulations or requirements under Section 112(r) of the federal Act are exempt from the requirement to obtain an Operating Permit.
* Any Acid Rain source as defined under title IV of the federal Act. The Acid Rain program has additional forms. See www.env.nm.gov/air-quality/air-quality-title-v-operating-permits-guidance-page/. Sources that are subject to both the Title V and Acid Rain regulations are encouraged to submit both applications simultaneously.
* Any source in a source category designated by the EPA Administrator ("Administrator"), in whole or in part, by regulation, after notice and comment.

The facility is a Title V major source as defined at 20.2.70 NMAC.

19.1 - 40 CFR 64, Compliance Assurance Monitoring (CAM) (20.2.70.300.D.10.e NMAC)

Any source subject to 40CFR, Part 64 (Compliance Assurance Monitoring) must submit all the information required by section 64.7 with the operating permit application. The applicant must prepare a separate section of the application package for this purpose; if the information is already listed elsewhere in the application package, make reference to that location. Facilities not subject to Part 64 are invited to submit periodic monitoring protocols with the application to help the AQB to comply with 20.2.70 NMAC. Sources subject to 40 CFR Part 64, must submit a statement indicating your source's compliance status with any enhanced monitoring and compliance certification requirements of the federal Act.

Based on information and belief formed after reasonable inquiry, Kinder Morgan states that the facility does not meet the applicability requirements of 40 CFR 64.2. Specifically, no sources at the facility are controlled major sources of regulated pollutants, and enhanced monitoring requirements are not applicable to this facility at this time. Kinder Morgan will submit the necessary statement should the facility or requirements change such that this requirement becomes applicable.

19.2 - Compliance Status (20.2.70.300.D.10.a & 10.b NMAC)

Describe the facility's compliance status with each applicable requirement at the time this permit application is submitted. This statement should include descriptions of or references to all methods used for determining compliance. This statement should include descriptions of monitoring, recordkeeping and reporting requirements and test methods used to determine compliance with all applicable requirements. Refer to Section 2, Tables 2-N and 2-O of the Application Form as necessary. (20.2.70.300.D.11 NMAC) For facilities with existing Title V permits, refer to most recent Compliance Certification for existing requirements. Address new requirements such as CAM, here, including steps being taken to achieve compliance.

As described here and based on information and belief formed after reasonable inquiry, Kinder Morgan believes that Washington Ranch Storage Facility is in compliance with each applicable as discussed here.

In the event that Kinder Morgan should discover new information affecting the compliance status of the facility, Kinder Morgan will make appropriate notifications and/or take corrective actions.
Pursuant to Condition A109 of Permit P064-R4, Kinder Morgan has certified to compliance with the terms and conditions of that permit. The Annual Compliance Certification Report is due within 30 days of the end of every 12-month reporting period. The 12-month reporting period starts on September 1st of each year.

19.3 - Continued Compliance (20.2.70.300.D.10.c NMAC)

Provide a statement that your facility will continue to be in compliance with requirements for which it is in compliance at the time of permit application. This statement must also include a commitment to comply with other applicable requirements as they come into effect during the permit term. This compliance must occur in a timely manner or be consistent with such schedule expressly required by the applicable requirement.

As described in Section 19.2 and based on information and belief formed after reasonable inquiry, Kinder Morgan states that Washington Ranch Storage Facility will continue to be operated in compliance with applicable requirements for which it is in compliance as of the date of submittal of this application.

In addition, Kinder Morgan will meet additional applicable requirements that become effective during the permit term in a timely manner or on such a time schedule as expressly required by the applicable requirement. In the event that Kinder Morgan should discover new information affecting the compliance status of the facility, Kinder Morgan will make appropriate notifications and/or take corrective actions as appropriate.

19.4 - Schedule for Submission of Compliance (20.2.70.300.D.10.d NMAC)

You must provide a proposed schedule for submission to the department of compliance certifications during the permit term. This certification must be submitted annually unless the applicable requirement or the department specifies a more frequent period. A sample form for these certifications will be attached to the permit.

The Annual Compliance Certification Report is due within 30 days of the end of every 12-month reporting period. The 12-month reporting period starts on September 1st of each year.

19.5 - Stratospheric Ozone and Climate Protection

In addition to completing the four (4) questions below, you must submit a statement indicating your source's compliance status with requirements of Title VI, Section 608 (National Recycling and Emissions Reduction Program) and Section 609 (Servicing of Motor Vehicle Air Conditioners).

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1. Does your facility have any air conditioners or refrigeration equipment that uses CFCs, HCFCs or other ozone-depleting substances? ☑ **Yes** ☐ **No**

2. Does any air conditioner(s) or any piece(s) of refrigeration equipment contain a refrigeration charge greater than 50 lbs? ☐ **Yes** ☑ **No**

   (If the answer is yes, describe the type of equipment and how many units are at the facility.)

3. Do your facility personnel maintain, service, repair, or dispose of any motor vehicle air conditioners (MVACs) or appliances ("appliance" and "MVAC" as defined at 82. 152)? ☐ **Yes** ☑ **No**

4. Cite and describe which Title VI requirements are applicable to your facility (i.e. 40 CFR Part 82, Subpart A through G.)

Based on information and belief formed after reasonable inquiry, Kinder Morgan states that Title VI, Section 608 (National Recycling and Emissions Reduction Program) of the Clean Air Act may apply to this facility, as Kinder Morgan may own CFC-containing appliances (40 CFR 82.150 (b) and 40 CFR 82.152). EPNG may own appliances affected by this subpart, and abides by this regulation. Kinder Morgan is in compliance with the requirements of this Section.
Kinder Morgan does not service motor vehicle air conditioners at this facility and therefore Section 609 does not apply.

Washington Ranch Storage Facility will continue to be operated in compliance with the requirements of Title VI, Section 608 of the Clean Air Act as they apply to this facility.

19.6 - Compliance Plan and Schedule

Applications for sources, which are not in compliance with all applicable requirements at the time the permit application is submitted to the department, must include a proposed compliance plan as part of the permit application package. This plan shall include the information requested below:

A. Description of Compliance Status: (20.2.70.300.D.11.a NMAC)
A narrative description of your facility's compliance status with respect to all applicable requirements (as defined in 20.2.70 NMAC) at the time this permit application is submitted to the department.

B. Compliance plan: (20.2.70.300.D.11.B NMAC)
A narrative description of the means by which your facility will achieve compliance with applicable requirements with which it is not in compliance at the time you submit your permit application package.

C. Compliance schedule: (20.2.70.300D.11.c NMAC)
A schedule of remedial measures that you plan to take, including an enforceable sequence of actions with milestones, which will lead to compliance with all applicable requirements for your source. This schedule of compliance must be at least as stringent as that contained in any consent decree or administrative order to which your source is subject. The obligations of any consent decree or administrative order are not in any way diminished by the schedule of compliance.

D. Schedule of Certified Progress Reports: (20.2.70.300.D.11.d NMAC)
A proposed schedule for submission to the department of certified progress reports must also be included in the compliance schedule. The proposed schedule must call for these reports to be submitted at least every six (6) months.

E. Acid Rain Sources: (20.2.70.300.D.11.e NMAC)
If your source is an acid rain source as defined by EPA, the following applies to you. For the portion of your acid rain source subject to the acid rain provisions of title IV of the federal Act, the compliance plan must also include any additional requirements under the acid rain provisions of title IV of the federal Act. Some requirements of title IV regarding the schedule and methods the source will use to achieve compliance with the acid rain emissions limitations may supersede the requirements of title V and 20.2.70 NMAC. You will need to consult with the Air Quality Bureau permitting staff concerning how to properly meet this requirement.

NOTE: The Acid Rain program has additional forms. See www.env.nm.gov/air-quality/air-quality-title-v-operating-permits-guidance-page/. Sources that are subject to both the Title V and Acid Rain regulations are **encouraged** to submit both applications **simultaneously**.

Based on information and belief formed after reasonable inquiry and as described in Section 19.2, and with this filing, Kinder Morgan states that Washington Ranch Storage Facility is in compliance with applicable requirements. There are no requirements under Section 19.6 as noted above.

19.7 - 112(r) Risk Management Plan (RMP)

Any major sources subject to section 112(r) of the Clean Air Act must list all substances that cause the source to be subject to section 112(r) in the application. The permittee must state when the RMP was submitted to and approved by EPA.

Based on information and belief formed after reasonable inquiry, Kinder Morgan states that Washington Ranch Storage Facility is not subject to 40 CFR 68, Chemical Accident Prevention Provisions.

As per 40 CFR 68.3 (defnitions), the term "Stationary source" does not apply to transportation of any regulated substance or any other extremely hazardous substance under the provisions of this part, provided that such transportation is regulated under 49 CFR part 192, 193, or 195 (DOT Office of Pipeline Safety Regulations).

Kinder Morgan's Washington Ranch Storage Facility is regulated under DOT Office of Pipeline Safety Regulations (49 CFR 192,193, and 195). Therefore, it is not subject to 112 (r).

19.8 - Distance to Other States, Bernalillo, Indian Tribes and Pueblos

Will the property on which the facility is proposed to be constructed or operated be closer than 80 km (50 miles) from other states, local pollution control programs, and Indian tribes and pueblos (20.2.70.402.A.2 and 20.2.70.7.B NMAC)?

(If the answer is yes, state which apply and provide the distances.)

States: Texas, 9 km

19.9 - Responsible Official

Provide the Responsible Official as defined in 20.2.70.7.AD NMAC:
Name: Heriberto Carreon
Title: Director-Operations Division 4
Phone: (806) 354-3108
Email: Heriberto_Carreon@kindermorgan.com
Address: 4711 S. Western, Amarillo, TX 79109

Section 22: Certification

Company Name: El Paso Natural Gas Company

I, Heriberto Carreon, hereby certify that the information and data submitted in this application are true and as accurate as possible, to the best of my knowledge and professional expertise and experience.

Signed this 5th day of December, 2022, upon my oath or affirmation, before a notary of the State of Texas.

*Signature

12/5/22
Date

Heriberto Carreon
Printed Name

Operations Director
Title

Scribed and sworn before me on this 5 day of December, 2022

My authorization as a notary of the State of Texas expires on the 4th day of April, 2026.

Notary's Signature

12/5/22
Date

Jeanette Medina
Notary's Printed Name

JEANETTE MEDINA
Notary Public, State of Texas
Comm. Expires 04-04-2026
Notary ID 133684556

*For Title V applications, the signature must be of the Responsible Official as defined in 20.2.70.7.AE NMAC.